

ASIAPACIFIC TELECOMMUNICATIONS

SERVICE TRENDS, 1988-1993

INPUT



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# ASIA/PACIFIC TELECOMMUNICATIONS SERVICE TRENDS, 1988-1993

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**Multiclient Study**

***Asia/Pacific Telecommunications Service  
Trends, 1988-1993***

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# Abstract

This report provides an assessment of user requirements for services and national service plans in eleven Asia/Pacific countries.

The report examines user needs, requirements, and concerns from the perspective of headquarters representatives of major U.S. corporations and from the perspective of representatives of major U.S. and European companies located in each of the countries.

The report provides an assessment of the development plans for the countries of Australia, China (PRC), Hong Kong, Indonesia, Japan, Korea (South), Malaysia, New Zealand, the Philippines, Singapore, and Thailand.

For each country, an assessment is provided of the need for basic services, such as telephone and telex, and the development of services such as facsimile, public networks, value-added networks, and leased circuit services.

For the major categories of services, projections are provided for development over the next five years, with emphasis on identifying where user needs and requirements may not be satisfied.

The report also discusses the general economic and political environment in each country, considering the impact that this could have on the development of telecommunications services.



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# Table of Contents

<b>I</b>	<b>Introduction</b>	<b>1</b>
	A. Purpose and Scope	1
	B. Methodology	2
	C. Report Organization	3
	D. Related INPUT Reports	4
<b>II</b>	<b>Executive Overview</b>	<b>5</b>
	A. The Environment Is Changing	5
	B. Continued Growth Expected	8
	C. User Needs Are Changing	10
	D. No Hong Kong Problem—Yet	12
	E. Summary Conclusions	13
<b>III</b>	<b>Organization Profiles</b>	<b>15</b>
	A. Companies Represented	15
	B. Countries Represented	16
	C. Budgets and Staff	18
	D. Service Criticality and Importance	20
	E. Decision Process and Knowledge	21
<b>IV</b>	<b>Regional Services Profile</b>	<b>27</b>
	A. Introduction	27
	B. Business Environment	27
	C. Regulatory Environment	30
	D. Service Developments and Forecasts	31
	1. Introduction	31
	2. Voice Services	31
	3. Text Services	36
	4. Leased Circuit Services	38



## Table of Contents (Continued)

5. Public Data/Value-Added Network Services	43
6. ISDN Services and Developments	50
7. Other Services	50
8. Rates and Tariffs—Trends	52
E. Regional Telecommunications Issues	53
1. Introduction	53
2. Organizations and Structures	54
3. Regional and International Regulations	55
4. Public versus Private Network Trends	55
5. Resale/Shared Use Trends	56
6. Telecommunications Standards	56
7. Privacy Protection/Data Flow Restrictions	57
8. Hong Kong Government Change— Regional Implications	57
F. User Needs, Requirements, and Concerns	58

### V

Conclusions and Recommendations	61
A. Conclusions	61
B. Recommendations—Vendors	63
C. Recommendations—Users	63

### VI

Country Profiles	65
A. Australia	65
1. Introduction	65
2. Economic and Political Setting	65
3. Telecommunications Services and Plans	66
a. Telecommunications Organizations	66
b. Voice Services	67
c. Text Services	70
d. Leased Circuit Services	70
e. Public Data/Value-Added Network Services	72
f. ISDN Services	73
4. National Telecommunications Issues	74
5. User Needs and Requirements	74
B. People's Republic of China (PRC)	75
1. Introduction	75
2. Economic and Political Setting	75
3. Telecommunications Services and Plans	76
a. Telecommunications Organizations	76
b. Voice Services	78
c. Text Services	79

# Table of Contents (Continued)

d. Leased Circuit Services	79
e. Public Data/Value-Added Network Services	80
f. ISDN Services	80
g. Other Services	81
4. National Telecommunications Issues	81
5. User Needs and Requirements	82
C. Hong Kong	83
1. Introduction	83
2. Economic and Political Setting	83
3. Telecommunications Services and Plans	84
a. Telecommunications Organizations	84
b. Voice Services	86
c. Text Services	87
d. Leased Circuit Services	87
e. Public Data/Value-Added Network Services	88
f. ISDN Services	89
4. National Telecommunications Issues	89
5. User Needs and Requirements	90
D. Indonesia	90
1. Introduction	90
2. Economic and Political Setting	90
3. Telecommunications Services and Plans	92
a. Telecommunications Organizations	92
b. Voice Services	93
c. Text Services	95
d. Leased Circuit Services	96
e. Public Data/Value-Added Network Services	97
f. ISDN Services	98
g. Other Services and Developments	99
4. National Telecommunications Issues	99
5. User Needs and Requirements	99
E. Japan	100
1. Introduction	100
2. Economic and Political Setting	100
3. Telecommunications Services and Plans	101
a. Telecommunications Organizations	101
b. Voice Services	103
c. Text Services	104
d. Leased Circuit Services	105
e. Public Data/Value-Added Network Services	105
f. ISDN Services	108
g. Other Services	108
4. National Telecommunications Issues	109
5. User Needs and Requirements	109

## Table of Contents (Continued)

F.	South Korea	110
1.	Introduction	110
2.	Economic and Political Setting	110
3.	Telecommunications Service Summary	112
a.	Telecommunications Organizations	112
b.	Voice Services	114
c.	Text Services	114
d.	Leased Circuit Services	116
e.	Public Data/Value-Added Network Services	116
f.	ISDN Services	119
4.	National Telecommunications Issues	119
a.	Telecommunications Organizations	119
b.	Regulatory Environment	120
5.	User Needs and Requirements	121
G.	Malaysia	121
1.	Introduction	121
2.	Economic and Political Setting	122
3.	Telecommunications Services and Plans	123
a.	Voice Services	123
b.	Text Services	125
c.	Leased Circuit Services	125
d.	Public Data/Value-Added Network Services	126
e.	ISDN Services	127
4.	National Telecommunications Issues	127
5.	User Needs and Requirements	127
H.	New Zealand	128
1.	Introduction	128
2.	Economic and Political Setting	128
3.	Telecommunications Services and Plans	129
a.	Voice Services	129
b.	Text Services	130
c.	Leased Circuit Services	131
d.	Public Data/Value-Added Network Services	131
e.	ISDN Services	132
4.	National Telecommunications Issues	132
5.	User Needs and Requirements	133
I.	Philippines	133
1.	Introduction	133
2.	Economic and Political Setting	133
3.	Telecommunications Services and Plans	135
a.	Telecommunications Organizations	135
b.	Voice Services	137
c.	Text Services	138
d.	Leased Circuit Services	139



## Table of Contents (Continued)

e.	Public Data/Value-Added Network Services	139
f.	ISDN Services	140
g.	Other Services	140
4.	National Telecommunications Issues	140
5.	User Needs and Requirements	141
J.	Singapore	142
1.	Introduction	142
2.	Economic and Political Setting	142
3.	Telecommunications Services and Plans	143
a.	Voice Services	143
b.	Text Services	144
c.	Leased Circuit Services	144
d.	Public Data/Value-Added Network Services	144
e.	ISDN Services	145
4.	National Telecommunications Issues	145
5.	User Needs and Requirements	145
K.	Thailand	146
1.	Introduction	146
2.	Economic and Political Setting	146
3.	Telecommunications Services and Plans	147
a.	Voice Services	147
b.	Text Services	148
c.	Leased Circuit Services	148
d.	Public Data/Value-Added Network Services	148
e.	ISDN Services	149
4.	National Telecommunications Issues	149
5.	User Needs and Requirements	149

---

<b>A</b>	Appendix: User Survey Document	151
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<b>B</b>	Appendix: Provider Survey Outline	159
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<b>C</b>	Appendix: Terms and Definitions	167
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# Exhibits

<b>II</b>	-1 Key National Development Priorities	6
	-2 Composition of User Circuits by Circuit Type	6
	-3 Telecommunications Services Growth, 1988-1993	8
	-4 Telex and Facsimile Services Growth, 1988-1993	9
	-5 Key User Needs	11
	-6 International Network Development— Decision Information Sources	13

<b>III</b>	-1 Industry Representation	15
	-2 Countries with Company Offices	17
	-3 Direct Staff Costs—Telecommunications Services	19
	-4 Data Network Costs by Service Type	20
	-5 Network Importance—Headquarters versus Country Staff	21
	-6 Decision Responsibility Location	22
	-7 Primary Network Benefit—Headquarters versus Country Understanding	23
	-8 International Network Development—Decision Information Sources	24

<b>IV</b>	-1 Multinational Production and Purchasing Plans	28
	-2 Degree of Deregulation	30
	-3 Countries Requiring Basic Telephone Service Development	32
	-4 International Voice and Data Transfer	33
	-5 International Telephone Use	34
	-6 Telex and Facsimile Services Growth, 1988-1993	37
	-7 Total Number of Circuits—Average for All Users	38
	-8 Composition of User Circuits by Circuit Type	40
	-9 Primary Location for Managing Regional Networks	41

# Exhibits (Continued)

-10	Companies that Would Consider Third-Party Management	42
-11	Public Data Network Use by Country—Domestic/International	44
-12	Primary Reasons for Use of Public Data Networks	45
-13	Reasons for Selecting a Specific Public Data Network	47
-14	Public Data Network Services—Projected Growth	49

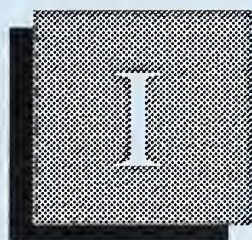
## VI

-1	Australia—Telecommunications Organizations—Key Changes	66
-2	Australia—International Telephone/Facsimile Growth	68
-3	Australia—Telephone Tariff Reduction—Reasons	69
-4	Australia—Leased Circuit Growth	70
-5	Australia—Public Data Network Growth	72
-6	Australia—Public Data Network Growth—Reasons	73
-7	China—Key Telecommunication Products	78
-8	Hong Kong—Organization Structure—Before Sale	85
-9	Hong Kong—Organization Structure—After Sale	85
-10	Hong Kong—International Telephone Traffic, 1988-1993	87
-11	Hong Kong—Leased Circuit Growth	88
-12	Hong Kong—Value-Added Services/Providers	89
-13	Indonesia—Telecommunications Organization	93
-14	Indonesia—Telephone Installed Base, 1988-1993	94
-15	Indonesia—Facsimile Services Growth, 1988-1993	96
-16	Indonesia—Leased Circuits—Percent by Type, 1986	97
-17	Indonesia—Public Data Network Growth	98
-18	Japan—Service Provider Classifications	102
-19	Japan—MPT Projected Telephone Growth	103
-20	Japan—Telex Traffic Projection	104
-21	Japan—Domestic Leased Circuit Growth—Conventional Circuits	106
-22	Japan—Domestic Leased Circuit Growth—High-Speed Circuits	106
-23	Korea—Contribution of Service Sector Revenue to GNP	111
-24	Korea—Telecommunications Authority of Korea Services	112
-25	Korea—DACOM Services	113
-26	Korea—Telephone Density per 100 Population	114
-27	Korea—Cellular Telephone Growth	115
-28	Korea—Telex Subscriber Growth	115
-29	Korea—Leased Circuit Services—Domestic/International	116



## Exhibits (Continued)

-30	Korea—Leased Circuit Service Growth	117
-31	Korea—Public Data Network Service— Subscriber Growth	117
-32	Korea—Public Data Network Use	118
-33	Malaysia—Cellular Service Growth	124
-34	Malaysia—Public Data Network Growth	126
-35	Philippines—National Expenditure Changes	134
-36	Philippines—National Expenditure by Type, 1986	134
-37	Philippines—Economic Development Expenditure	135
-38	Philippines—Key Service Providers	136
-39	Philippines—Cellular Services, 1988-1993	138

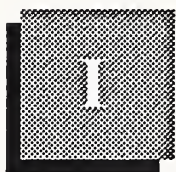


# Introduction









# Introduction

## A

### Purpose and Scope

Whether large or small, businesses are increasingly focusing on foreign countries as a source of supply or as a potential market.

The growth of international business, coupled with the increasing need to ensure the availability of current, accurate information about business activities is driving many organizations to implement or expand international telecommunications services.

With the development of these international services, organizations are frequently faced with a lack of services in some countries and rules and regulations that are generally not found at home.

However, the international telecommunications environment is changing rapidly. An increasing number of foreign authorities recognize the benefits of value-added services and, in some countries, see the development of public network-based services as a means to solve some of their national development difficulties.

Concurrent with this development of services, rules and regulations are beginning to change in many countries. With privatization becoming an increasing trend, a number of countries are beginning to liberalize their policies, providing a more competitive environment.

A number of the trends that have been seen recently will continue to develop and a number may be replaced by new developments over the next two to three years.

The purpose of the report is to identify key trends and directions in user needs, user requirements, and national developments. Specifically, the report addresses three questions:

- What are the key needs and requirements of users and how will they be changing in the next few years?
- What are the key trends in national developments?
- What are the differences between user needs and national developments that could cause user needs to be unfulfilled?

The scope of the research included interviews with senior representatives of major multinational corporations, in-country representatives of multinational corporations, and senior representatives of the telecommunications authority in 11 countries in the Asia/Pacific area. The following countries were included:

- Australia
- China (PRC)
- Hong Kong
- Indonesia
- Japan
- Korea (South)
- Malaysia
- New Zealand
- Philippines
- Singapore
- Thailand

The selection of countries to be included in the research was based on responses received from client companies, which indicated those ten countries for which they had the greatest interest.

Since the planned project was to include ten countries, companies were asked to identify the ten countries in which they had the greatest interest.

Following selection of the countries, specific appointments were set up with representatives in each country. Subsequently, the representative from China cancelled the appointment, suggesting a meeting with a representative in Hong Kong, which was accomplished.

Since the in-country meeting in China could not be held as originally planned, an eleventh country, New Zealand, was added to compensate for the possible lack of depth in the research for China.

## B

### Methodology

Research for the report included a review of published data to identify activities and trends that have been noted and extensive primary research with the user and provider communities. Key elements of the research included the following:

- An extensive review of background data about changes that are taking place within the region and within each country was conducted.
- This was followed by a comprehensive survey of needs and requirements of the headquarters office of major U.S. companies that have operations in the Asia/Pacific area.
- Interviews with headquarters staff were augmented with interviews with representatives of large U.S. and European companies in the countries included in the survey.
- Interviews were conducted with representatives of the telecommunications authority in each of the countries included in the study. Representatives of the authorities were typically senior officials responsible for either planning or operations.
- Results of the interviews were entered into a database and analysis conducted to determine trends that might emerge.

For many of the objective questions, users were asked to provide a rating. For rating questions, users were asked to respond on a scale of 1 to 5, where '1' was always lowest or least important, and '5' was always highest or most important.

In the preparation of the report, quantitative data for the regional profile is derived primarily from user projections of requirements for the next five years. Quantitative data for the country profiles is derived primarily from information obtained from service providers and users operating within the country.

## C

### Report Organization

The report is organized into four major parts.

- Chapter II is an Executive Overview of the report.
- Chapter III provides a summary profile of the telecommunications activities of organizations included in the study.
- Chapter IV comprises several parts, providing an assessment of services and trends in the Asia/Pacific region. The chapter considers the following major areas:
  - Business growth
  - Regulatory environment
  - Service developments and forecasts
  - Regional telecommunications issues
  - User needs, requirements, and concerns

- Chapter V provides a number of conclusions about regional developments and trends and recommendations for users and providers.
- Appendix A provides a profile of the major telecommunications trends and developments for countries included in the research.

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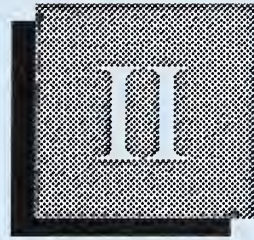
## D

### Related INPUT Reports

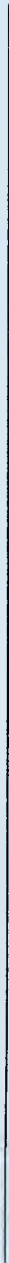
Other INPUT reports related to multinational telecommunications services include the following:

- *Handbook of International Public Data Networks* - The handbook provides a comprehensive reference to international public data network services in approximately 40 countries throughout the world.
- *National Service Profiles* - The national profiles provide a comprehensive reference to national and international telephone, telex, leased circuit and public network service and tariffs for approximately 40 major business countries throughout the world.

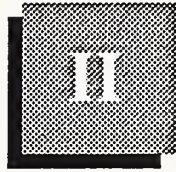




# Executive Overview







## Executive Overview

### A

#### The Environment Is Changing

To the manager involved in the day-to-day management of an Asia/Pacific regional network, there might appear to be few changes taking place in the region.

Likewise, the organization that is just beginning to expand into the region and develop telecommunications services would most likely not see the changes that have taken place nor those that are likely to take place over the next several years.

But, from all indications, there are numerous changes taking place and more are likely to come.

Key among the changes is the beginning of a shift in focus from circuit capacity to public-network-based services (Exhibit II-1).

- All of the administrative authorities contacted indicated that the development of national public data networks is among their top priorities.
- All the authorities indicated that they will place increased emphasis on the development and marketing of domestic and international value-added network services.
- In lesser developed countries, the top priority remains the development of a national infrastructure. However, a number of the authorities view public data networks as a means to develop national services.

EXHIBIT II-1

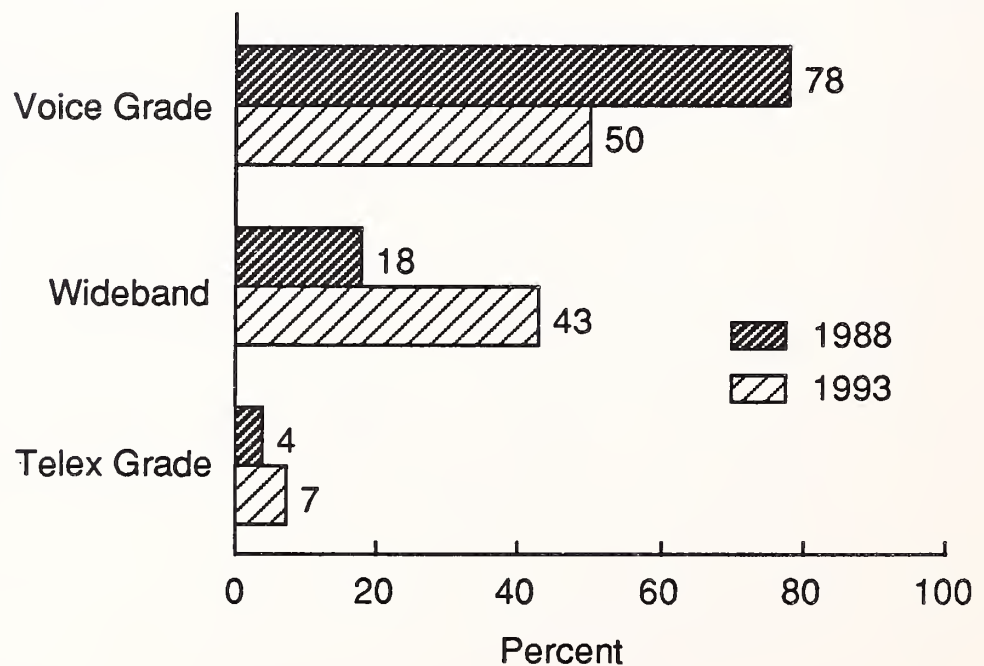
### KEY NATIONAL DEVELOPMENT PRIORITIES

- National Infrastructure
- Public Pocket Networks
- Value-Added Services
- Wideband Circuits

Following the development of public data networks, the most frequently mentioned development trend is the shift to higher-speed circuits. As indicated in Exhibit II-2, users expect to place increased emphasis on the use of higher-speed services over the next five years.

EXHIBIT II-2

### COMPOSITION OF USER CIRCUITS BY CIRCUIT TYPE





There were several reasons noted by users for shifting from lower-speed to higher-speed circuits.

- **Business Integration** - Users are increasingly incorporating foreign locations into the mainstream business process. The business integration has placed greater demands on foreign locations for business information.
- **Systems Integration** - With the increasing business integration, there has been an increasing trend to integrate business elements through automation. With the integration, interaction or the transmission of large files is replacing the simple one-page, consolidated monthly report.
- **Greater Flexibility** - With wideband circuits, users are better able to control circuit usage. Lower-speed circuits are frequently dedicated to a single application. Wideband circuits permit the consolidation of a variety of circuits into single streams of data. The circuit can be subdivided as necessary to meet changing business needs.

With the increasing focus on value-added networks, users are increasingly interested in services such as E-mail and emerging services such as EDI.

- E-mail was the most frequently mentioned value-added service requirement by both providers and users. However, national providers indicate that the demand for basic services is generally satisfied and that future requirements will be for enhanced E-mail services.
- The key enhancement needed to make international E-mail truly effective is the ability to interconnect international networks. The lack of interconnectivity is the most serious deficiency existing today.

In addition to the changes in service requirements, there have been basic changes to the policies and regulations of many of the national providers.

- A number of providers now indicate they will start permitting users to share networks—at least to a greater extent than previously. Initially, this will be limited to wideband services, but the change opens the door for precedents at a later date.
- There has been significant expansion of liberalized policies pertaining to the provision of equipment. Nearly all countries indicated that equipment can be provided by independent organizations.

- In an increasing number of countries, value-added services are provided by independent organizations. This trend is expected to continue gradually until most countries have agreements for the provision of value-added network services.

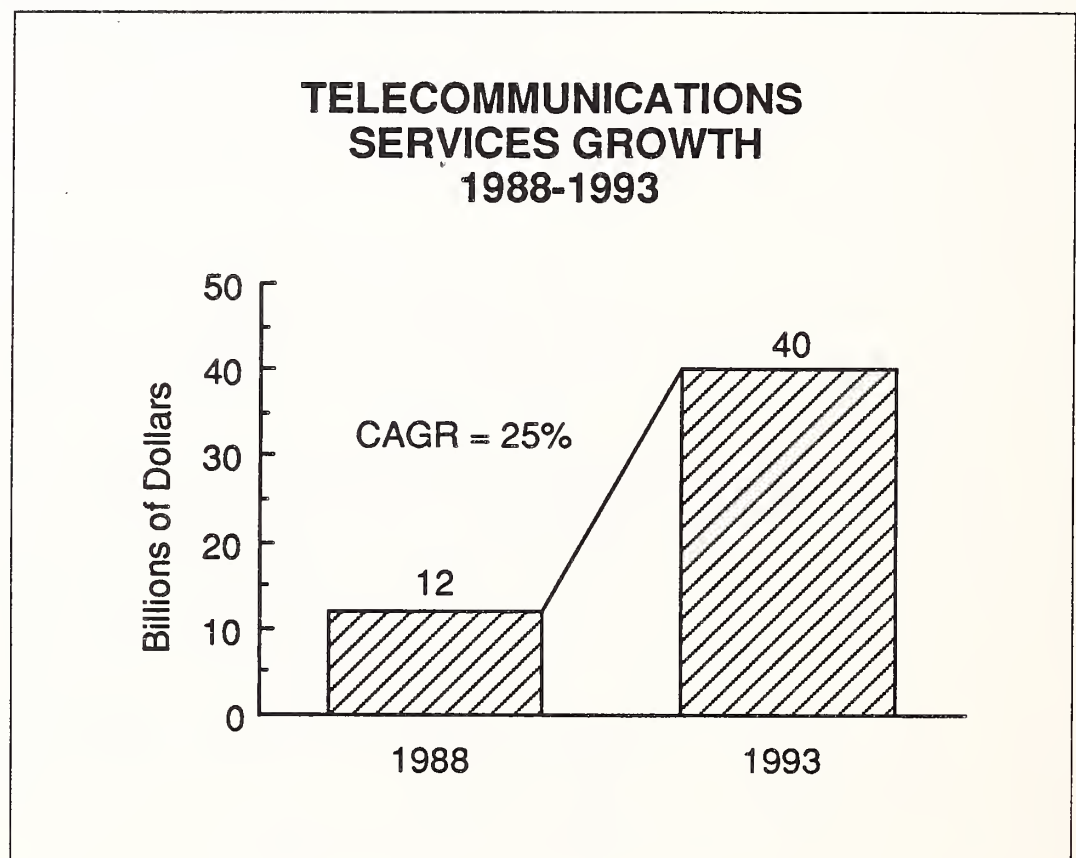
## B

### Continued Growth Expected

There has been a steady growth of telecommunications services in the region. Driven by dynamic, growing economies, the growth is expected to continue in nearly all areas.

Driven by the continuing growth of telephone-based services such as facsimile and dialed access to public networks, the overall market for telecommunications services in the Asia/Pacific area will grow from an estimated \$12 billion in 1988 to nearly \$40 billion by 1993 (Exhibit II-3).

EXHIBIT II-3



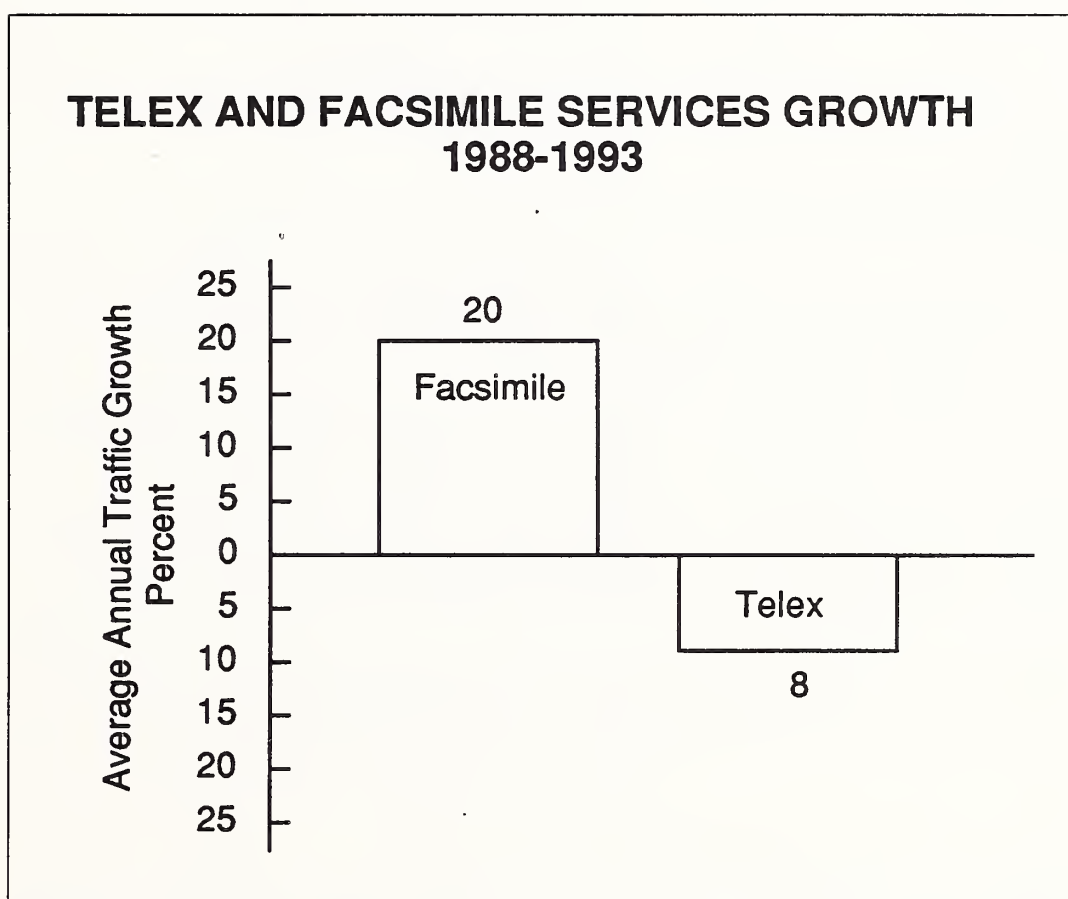
In addition to increases resulting from the continued growth in services such as basic telephone, the rapidly increasing growth in services such as wideband circuits and value-added network services will spur high growth rates.

Basic voice (PSTN) services will continue to grow at a steady rate as business expands. However, overall growth will be significantly greater, driven by the increasing use of facsimile. Including the growth of facsimile, the growth of international PSTN-related services is projected to be at least 25% per year.

One of the areas that is seeing the greatest changes is text services. Although telex will remain a mainstay for many years, the growth of facsimile is beginning to erode the growth rate of telex.

Most countries indicate that they have seen a gradual decline in the use of telex and that the trend will continue as facsimile becomes more popular. Exhibit II-4 indicates the relative growth of telex and facsimile.

EXHIBIT II-4



In China, development of telex will continue as the government expands services to more remote areas of the country. Considerable effort has been invested in developing means to transmit ideographic characters that are needed in the majority of the country.



INPUT expects facsimile to continue to grow at least until there is a suitable alternative for the transmission of text. E-mail is a likely candidate, but E-mail cannot begin to replace the benefits of facsimile until connectivity is achieved between international networks.

As indicated in Exhibit II-2, there is a shift in the demand for leased circuits from lower to higher speeds.

- Over the next five years, the demand for voice-grade (AVD) circuits will decrease by as much as 36% relative to the demand for wideband circuits. Though the demand for voice-grade circuits will continue to grow at an estimated 10% to 12% per year, the primary emphasis will be on higher speeds.
- As indicated, users believe that wideband circuits (50 Kbps and higher) will comprise a greater share of their networks five years from now. Currently accounting for an estimated 18% of the total number of circuits, wideband circuits will grow by an estimated 139% over the next five years.

The primary growth will result from a shift from lower-speed to higher-speed circuits. The growth rate for wideband circuits is projected to be 10% to 12% per year.

The projected rate of growth for public network services varies considerably. Countries that have developed networks but have not placed emphasis on marketing the services indicate that growth could exceed 100% per year for the next couple of years. Countries with emerging or developed networks that have been promoted indicate that growth could be 20% to 30% per year.

Considering the size of the service base of developed and lesser developed countries, INPUT estimates that the overall growth rate for telecommunications services will be at least 35% per year. However, this could be considerably exceeded if interconnectivity is achieved within the next few years.

## C

### User Needs Are Changing

Although traditional user requirements for more domestic services, tariff reductions and an easing of policy restrictions remain on the lists of user needs, they were not the most frequently mentioned needs noted during the survey process. Key user needs are shown in Exhibit II-5, in the order in which they were most often mentioned.

- Domestic Services - An increase in the level of domestic services will continue to be a high priority, particularly as users shift their business emphasis to lesser developed countries.



## EXHIBIT II-5

**KEY USER NEEDS**

- Domestic Services
- Universal Connectivity
- Enhanced E-Mail
- EDI
- Tariff Reductions
- Ease Policy Restrictions

- **Universal Connectivity** - The ability to interconnect networks is an exceptionally high priority among the majority of users. The interconnection includes both private to public and public to public network connections.
- **Enhanced E-mail** - Next to connectivity, E-mail was the most important service to the majority of the user community. Enhanced E-mail was also the most frequently mentioned service needed by the national providers.
- **Electronic Data Interchange** - EDI is growing in importance, and an increasing number of users and providers are interested in implementing some form of EDI capability.
- **Tariff Reductions** - Reductions in tariffs will remain a priority to users for a considerable length of time.
- **Ease Policy Restrictions** - Most users in the countries recognize the trend toward the easing of restrictions, but believe that additional easing is necessary.

Among the list of key user needs, it is important to note that, with the exception of improved domestic services, the key items of interest relate to increased functionality.

It is equally interesting to note that, although they are certainly important, reductions in tariffs and more liberal policies are of lesser importance than the functionality that is being increasingly delivered through value-added networks.

From information gathered during the survey, it is increasingly clear that users have two major categories of needs.

- The first is increased flexibility. This is reflected in the demand for higher-speed services that provide design options not previously available.
- The second is greater functionality. Users are increasingly interested in services that will increase the overall effectiveness of the business, and they are looking to the service providers to make the functionality available as added value.

One finding of the research that indicated a change in user organizations is that in the majority of user organizations, no individual visits a country prior to making a decision about services in the country.

The research indicated that the majority of decisions to implement or expand a network are based on information from International Record Carriers, local service providers or, to a lesser degree, third-party consultants.

## D

### No Hong Kong Problem—Yet

The pending changes in Hong Kong have caused concern to many users and providers. Nearly 50% of the users indicate that the pending changes are a consideration in their planning process.

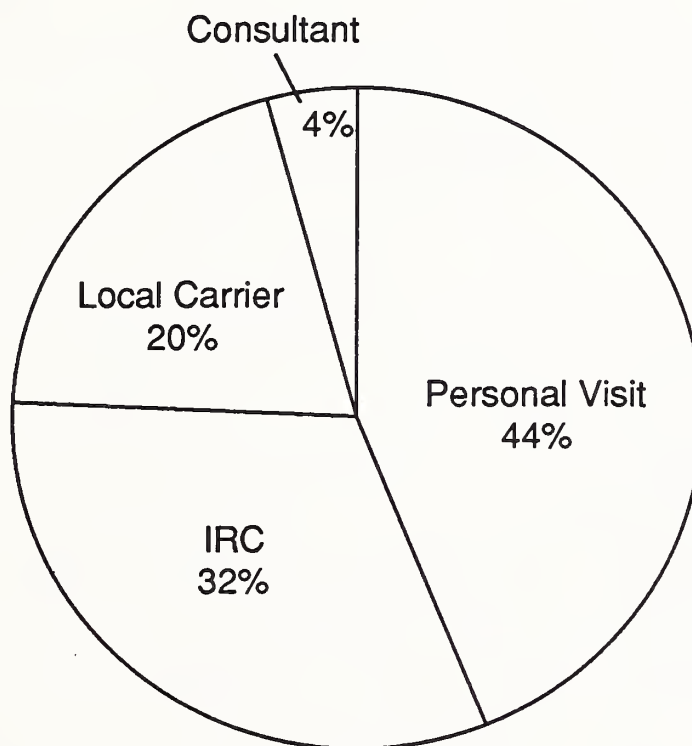
However, users generally believe that there will be little, if any, changes in the colony for the next two to three years.

Many of the businesses in Hong Kong have adopted a wait-and-see attitude until the 'Basic Law' is promulgated within the next two years. They believe that only then will they be able to develop a sense of the direction that the colony will take after 1997.

Users that are concerned have generally adopted a strategy that is defensive. They are developing plans that will permit them to react quickly if the need should arise.

There is general agreement between users and providers that little will happen to cause major concern within the next couple years.

EXHIBIT II-6

**INTERNATIONAL NETWORK DEVELOPMENT  
DECISION INFORMATION SOURCES****E****Summary  
Conclusions**

There are a number of conclusions and recommendations for both users and providers in Chapter V of the report. The following are provided as summary statements.

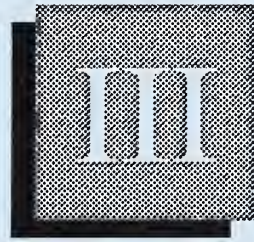
The Asia/Pacific area is dynamic and growing. For providers, there are numerous opportunities in the areas of value-added services, software and the development of basic national services.

However, to be successful, providers must be able to demonstrate that they are committed to the long term, that they can offer added value and that they have a demonstratable interest in establishing a working relationship.

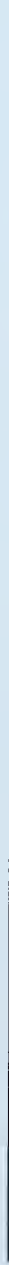
For users, the environment is changing more rapidly than is readily noticeable on the surface. To ensure the most cost-effective services today and tomorrow, users should increasingly invest in developing personal relationships with the national authorities.

Users should be prepared to discuss current and future plans and identify specific needs for services in the future. National providers continually indicated that they were not aware of specific user needs and requirements.

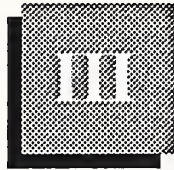




# Organization Profiles







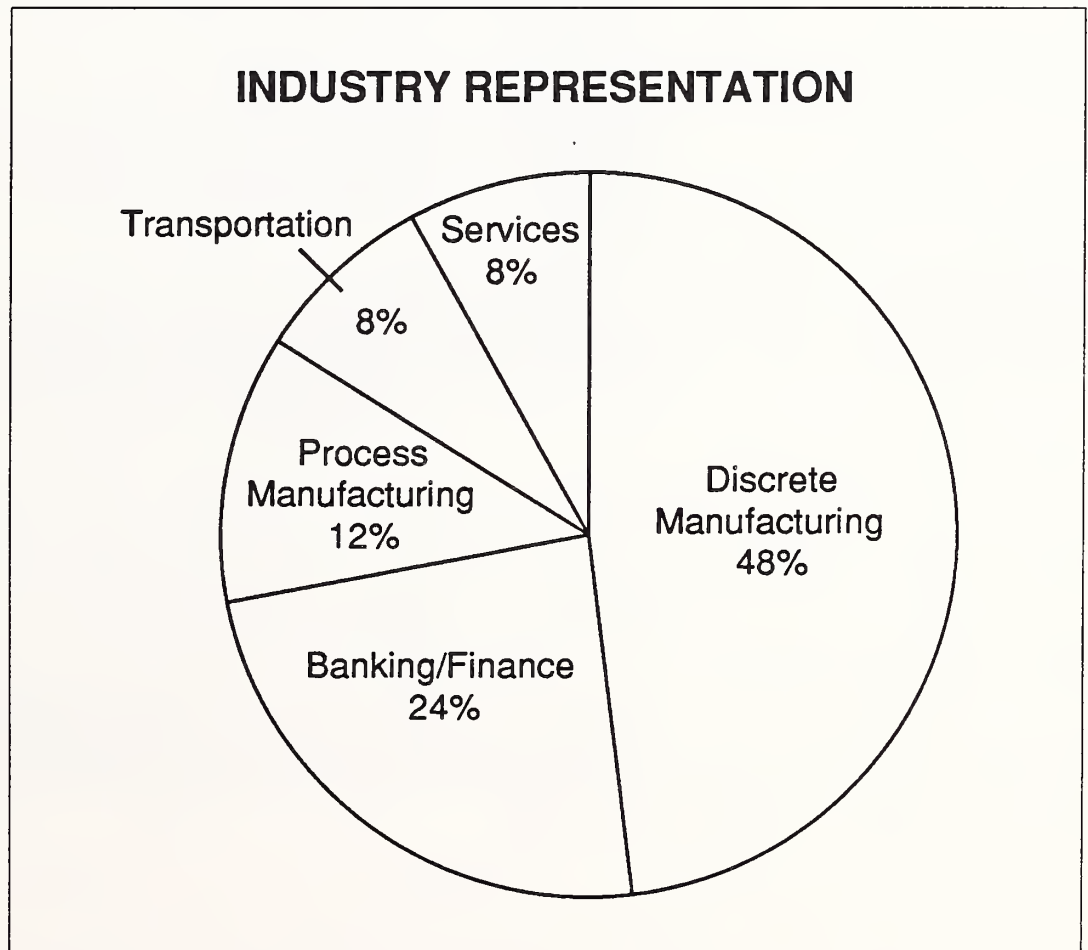
## Organization Profiles

### A

#### Companies Represented

Companies included in the surveys represented a cross section of industries. As indicated in Exhibit III-1, the predominate industry represented was discrete manufacturing, followed by banking and finance. These were followed by process manufacturing. Transportation and services were also included, but represented a lesser proportion of the companies.

EXHIBIT III-1



In order for a company to be considered for inclusion in the survey, two basic requirements needed to be met.

- A company had to have offices in a minimum of two countries. The offices had to be company offices rather than offices of a representative or subsidiary.
- A company had to have a minimum of 1,000 employees.

Based on the basic requirements, approximately 125 companies were selected as prospects. When the initial contacts were made to set up interviews, a couple of patterns began to emerge.

- Companies with fewer than 5,000 to 10,000 employees did not consider themselves sufficiently significant users of international telecommunications services in the Asia/Pacific area to be included in the survey.
- Though these companies were not unwilling to participate, they did not consider themselves large enough to provide meaningful data. As a result, limited information was gathered from a number of companies that contributed to the base of subjective information, but was not considered sufficiently comprehensive to be included in the statistical results.
- In companies with a large number of employees and multiple operating groups and/or locations, there is frequently no single point of contact for information about international services.

## B

### Countries Represented

One of the objectives of the research was to identify countries where the majority of companies are located. Identifying countries with the greatest number of company offices would form a base for identifying changes in business patterns in the future.

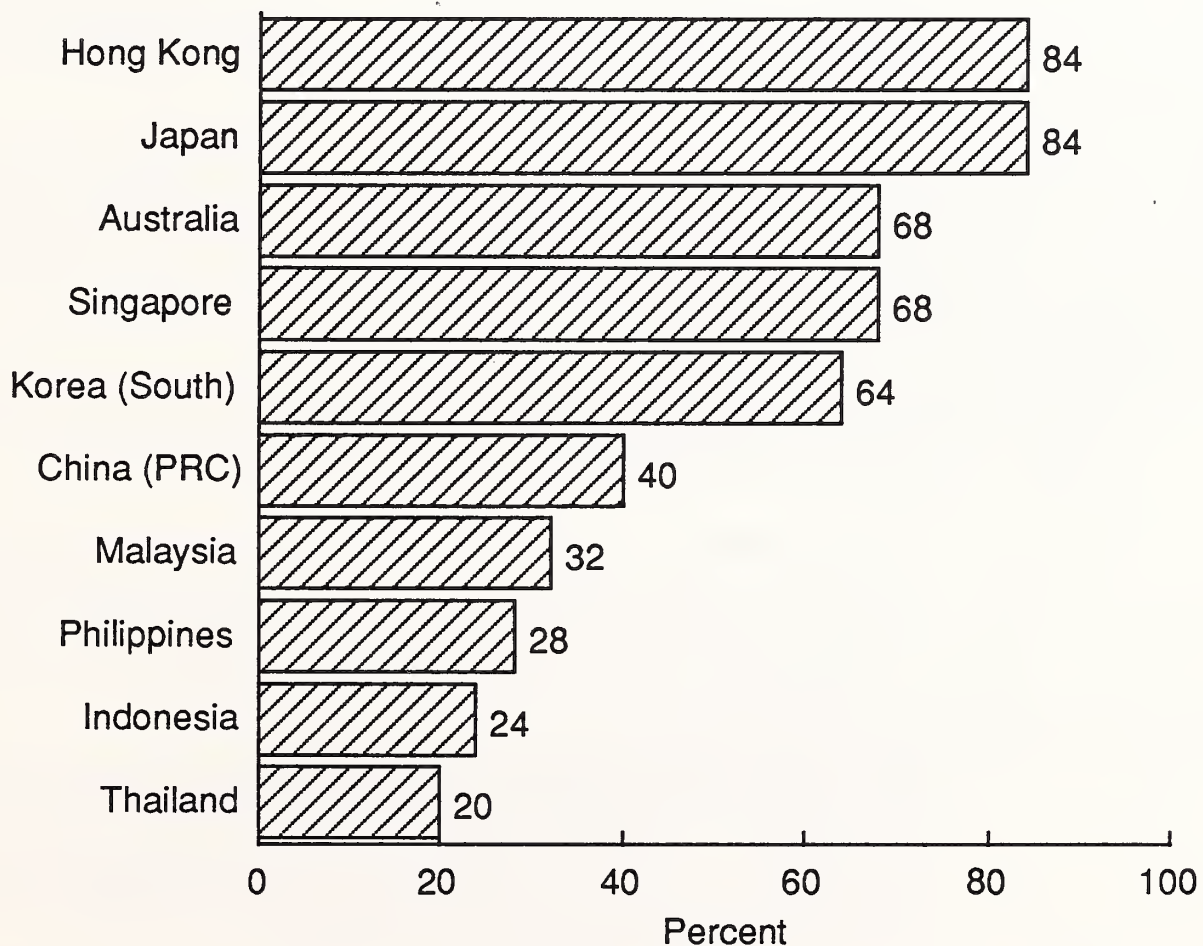
Of the eleven countries surveyed, ten were included in the calculation of where offices are located. Though the overall results may not be surprising, they do indicate at least one change over the past several years. Exhibit III-2 summarizes the results.

- The two countries in which the most companies were located were Hong Kong and Japan. Eighty-four percent (84%) of the companies surveyed indicated that they have at least one office in each of these countries.

- Following Hong Kong and Japan, Singapore and Australia were the next most popular, registering 68% of the companies with offices. Considering the somewhat lackluster performance of Australia over the past few years, it ranked somewhat higher than expected.
- Korea was ranked next. Of the total companies surveyed, 64% indicated that they have an office in Korea. This ranking was not surprising, considering the dramatic growth that the country has experienced over the past several years.
- Considering the difficulties of operating in the PRC, finding that 40% of the companies have at least one office in the PRC was somewhat surprising. Many companies prefer to operate from an office located in Hong Kong, but the number of offices in the PRC is growing, despite the difficulties.

EXHIBIT III-2

### COUNTRIES WITH COMPANY OFFICES



New Zealand not included in statistics



- Following the leading countries were Malaysia, Philippines, Indonesia, and Thailand. Among the latter countries, Malaysia is the highest with 32% of the companies having an office, and Thailand was the lowest with only 20%.

Although the telecommunications services available in a country is not a leading reason for selecting or not selecting a country, two financial services organizations indicated that the lack of services is a contributing factor in the selection.

Both organizations indicated that their company has delayed the introduction of certain services due to the lack of quality telecommunications services. It was interesting to note that the cost of services was a consideration, but not a key factor.

## C

### Budgets and Staff

Companies included in the survey varied in size and complexity. Though the size varied, the majority had a minimum of \$50 to \$100 million in sales. As a qualification to be included in the survey, they had to have offices in at least two Asia/Pacific countries.

Companies were asked to identify their total telecommunications budget. The average stated was \$25 million. The highest figure provided was \$100 million, and the lowest was \$1 million.

Companies were then asked to identify the percent of their telecommunications budgets that are allocated to providing international service. Responses ranged from a high of 77% to a low of 2%. The average was 24%. (Note: eliminating the exceptionally high and low reduces the overall percentage to approximately 21%.)

- The company that reported 77%, is a service company whose revenues are derived almost exclusively from international service and that is heavily reliant on telecommunications services.
- The company that reported 2% is a large retail products company with extensive overseas activities, but with few offices and little need for extensive interaction between offices or with headquarters. The majority of its activities are handled by independent distributors in countries throughout the region.

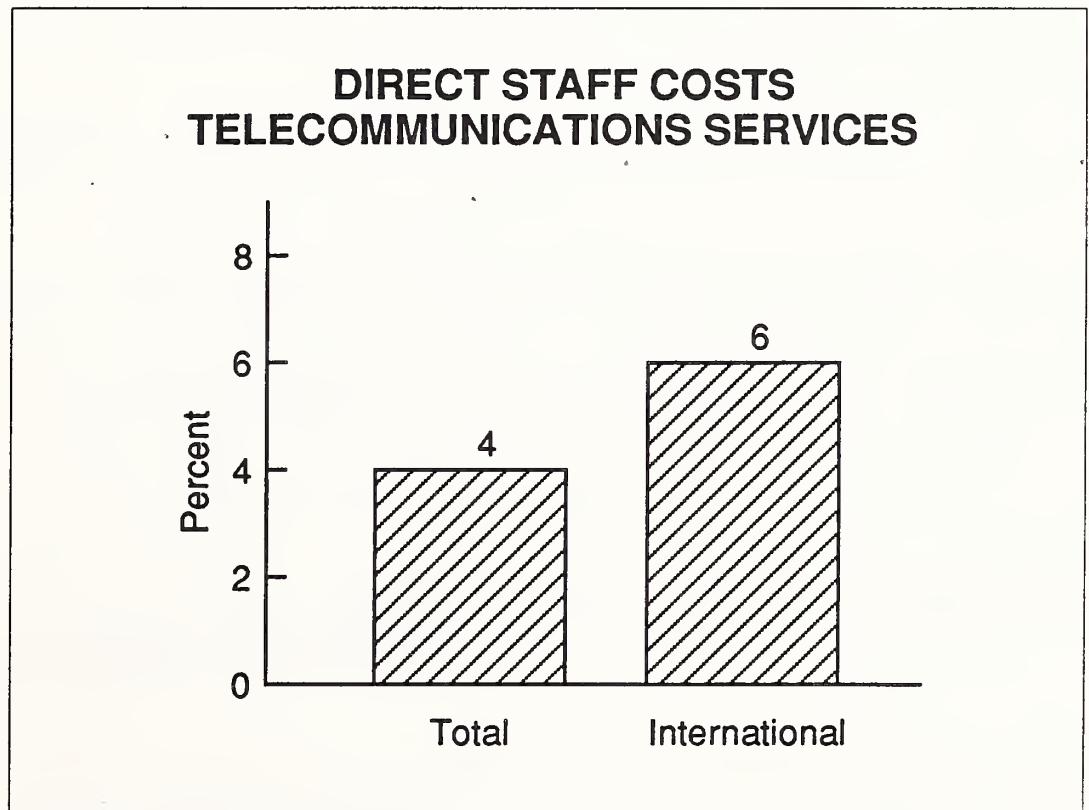
Industry data indicates that there has been a gradual change in the portion of a company's budget spent for international services. Several years ago, a generally accepted amount ranged between 12% and 15%. The current figures indicate a definitive trend towards increased expenditures for international telecommunications services.

Of key concern in many organizations is the staff cost associated with developing and maintaining telecommunications networks. In addition, companies frequently indicated that the costs to develop international networks are exceptionally high.

Recognizing that staff cost is a key component of any telecommunications project, companies were asked to identify the percent of their total cost is for direct staff.

The responses to the survey indicate that the direct costs associated with telecommunications services are considerably less than anticipated. In addition, the incremental cost associated with international services is comparatively minor. Responses indicate that an estimated 4% of overall costs are for staff and that only 6% of international costs are related to staff (Exhibit III-3).

EXHIBIT III-3

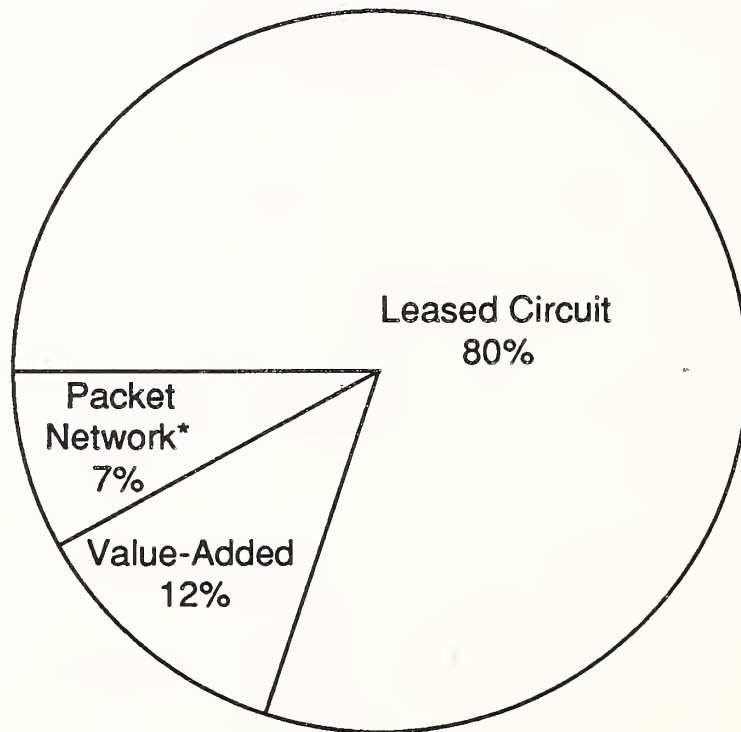


Users were also asked to provide an estimate of the percent of their total data network costs that are spent for leased circuits, packet network (data transport) and value-added network services.

For the companies included in the survey, leased circuits remain the highest percentage of the cost (80%). Together, packet network and value-added services currently account for less than 20% of total data network costs (Exhibit III-4). However, if trends noted as part of this research are realized, the proportional costs could begin to change significantly over the next several years.

EXHIBIT III-4

### DATA NETWORK COSTS BY SERVICE TYPE



\* Packet network refers to public networks used for data transmission only

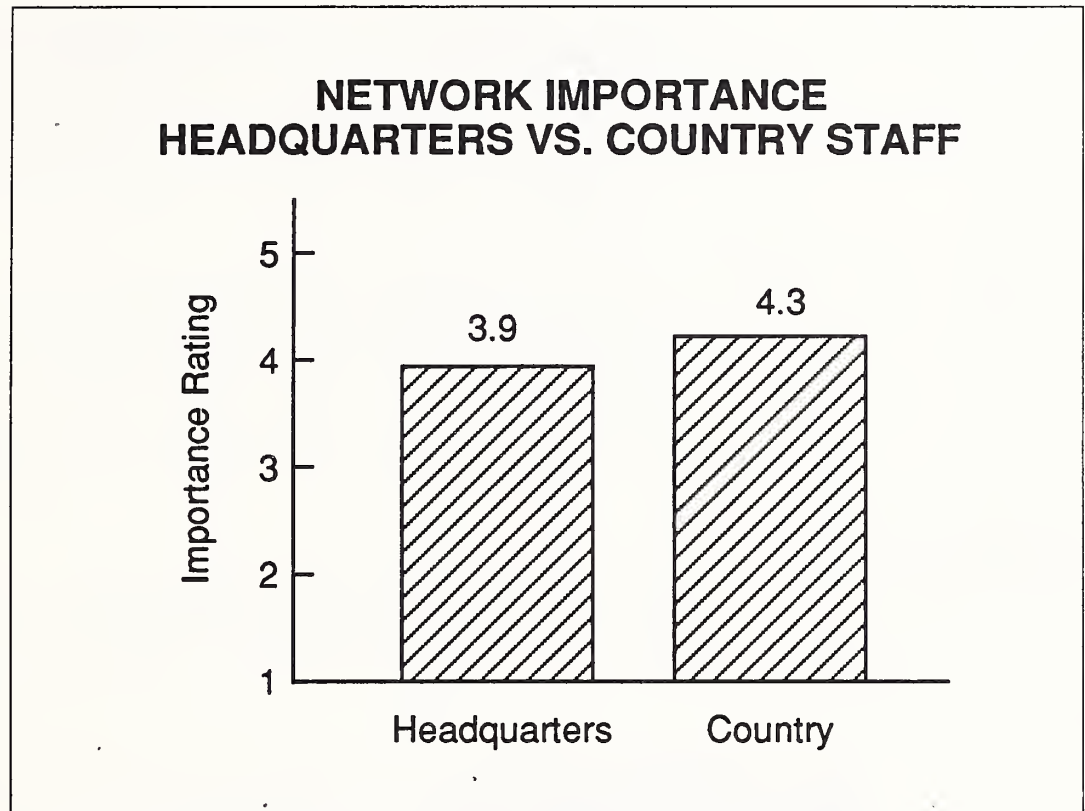
## D

### Service Criticality and Importance

Considering the overall growth of international business and the increasing importance of timely and accurate information to the success of a business, users were asked to provide a rating of the importance of their international network to the success of the business.

Although the responses from both headquarters and in-country staff indicated a very high level of importance of their international network, the responses from in-country staff were somewhat higher than those for headquarters staff (Exhibit III-5).

## EXHIBIT III-5



The reasons in-country staff consider the network to be of higher importance are not clear, but there are several possible explanations.

- For headquarters staff, the international network is a lesser percent of the total network that must be managed. Headquarters staff are frequently more familiar with the overall business and could therefore place greater importance on the 'bigger picture'.
- For in-country staff, the network is their link to the rest of the company and they would have a greater sense of impact when the network is not available to accomplish their work.
- In addition, with the increasing emphasis on services such as electronic mail, the international network may tend to become a social connection with the rest of the company.

**E****Decision Process and Knowledge**

Considering the costs associated with developing and maintaining an international network, a number of questions were included to identify some basic points about the decision process for implementing (or expanding) a network in a country.

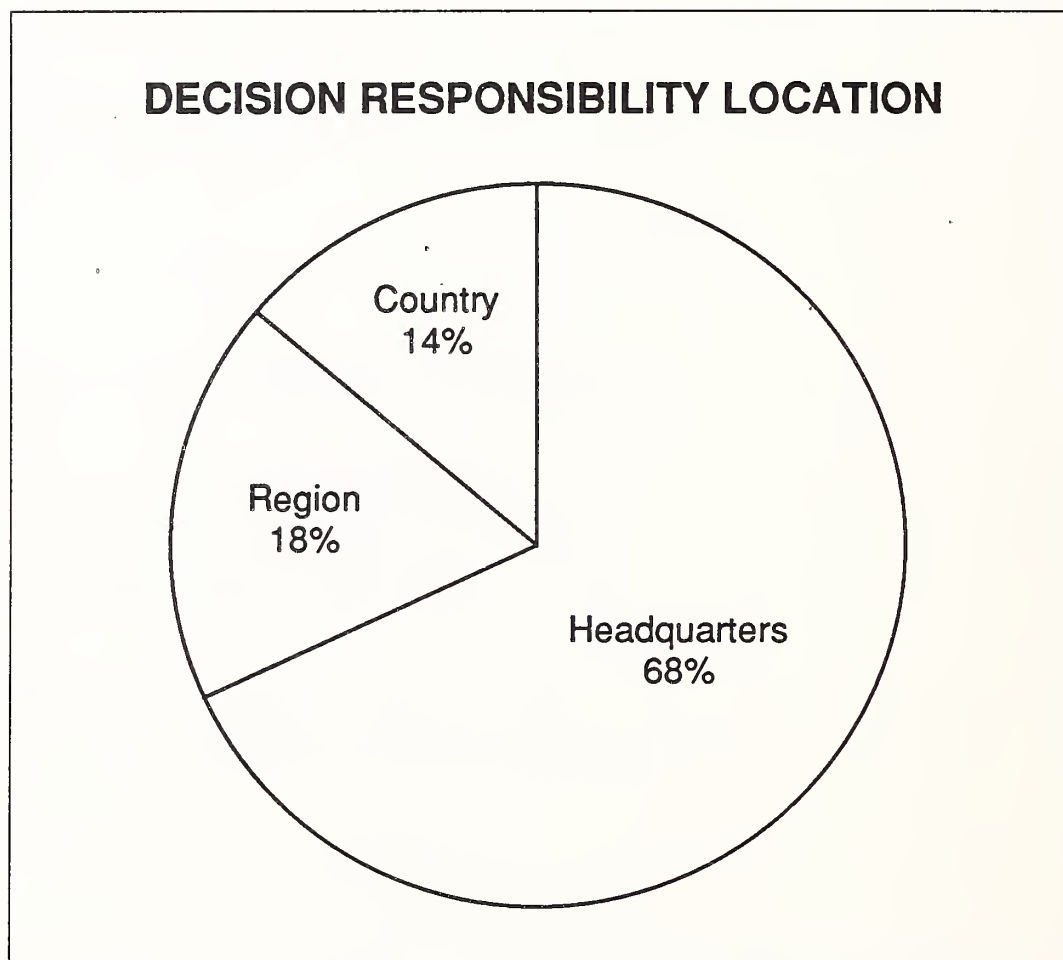
Of interest to a number of people is the degree of autonomy that regional and in-country staff have regarding operational decisions.



Recognizing that the majority of decisions need to be at least reviewed, and frequently approved, by headquarters staff, users were asked to identify the locations where the majority of the 'operational' decisions are made. An operational decision was generally described as the determination of a need and the basic category of resources necessary to meet the need.

In nearly all cases, users indicated that the decisions are made by headquarters staff. However, it is interesting to note that nearly a third of the decisions are made by staff located either in the country or at a regional office (Exhibit III-6). Several years ago, only an estimated 15% to 18% of the basic decisions were made by local or regional staff.

EXHIBIT III-6



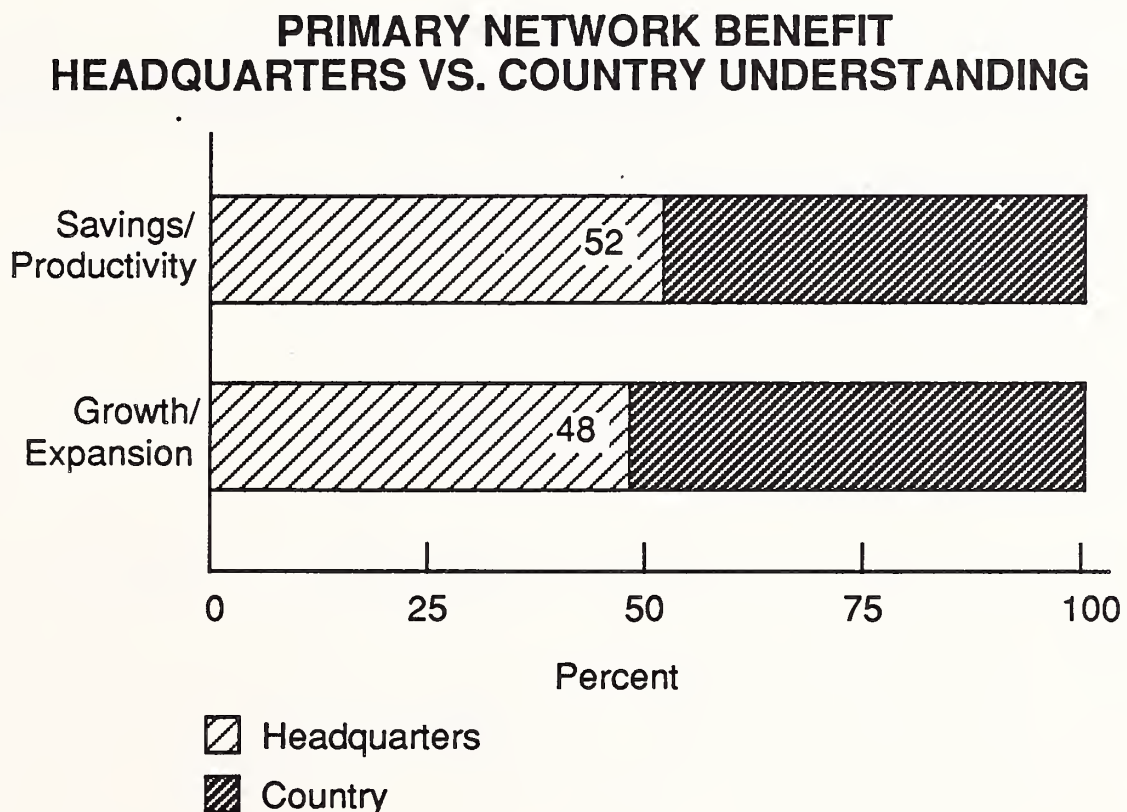
From the responses to the surveys, a difference between headquarters and in-country staff can be noted regarding the key reasons for implementing a network.



As part of the survey, users were asked to indicate whether their networks are implemented for the purpose of realizing 'cost saving and increased productivity' or whether their primary purpose is to support 'revenue growth and strategic expansion'. The results proved interesting.

Responses to the questions indicate that there is a relatively even split between 'cost savings' and 'revenue growth'. However, it is interesting to note that headquarters staff believe that cost savings are the primary reason and in-country staff believe that the primary reason is to achieve revenue growth and strategic expansion (Exhibit III-7).

EXHIBIT III-7



The exact reason for the differences in perspective between headquarters and in-country staff are not clear. A couple of possibilities emerge.

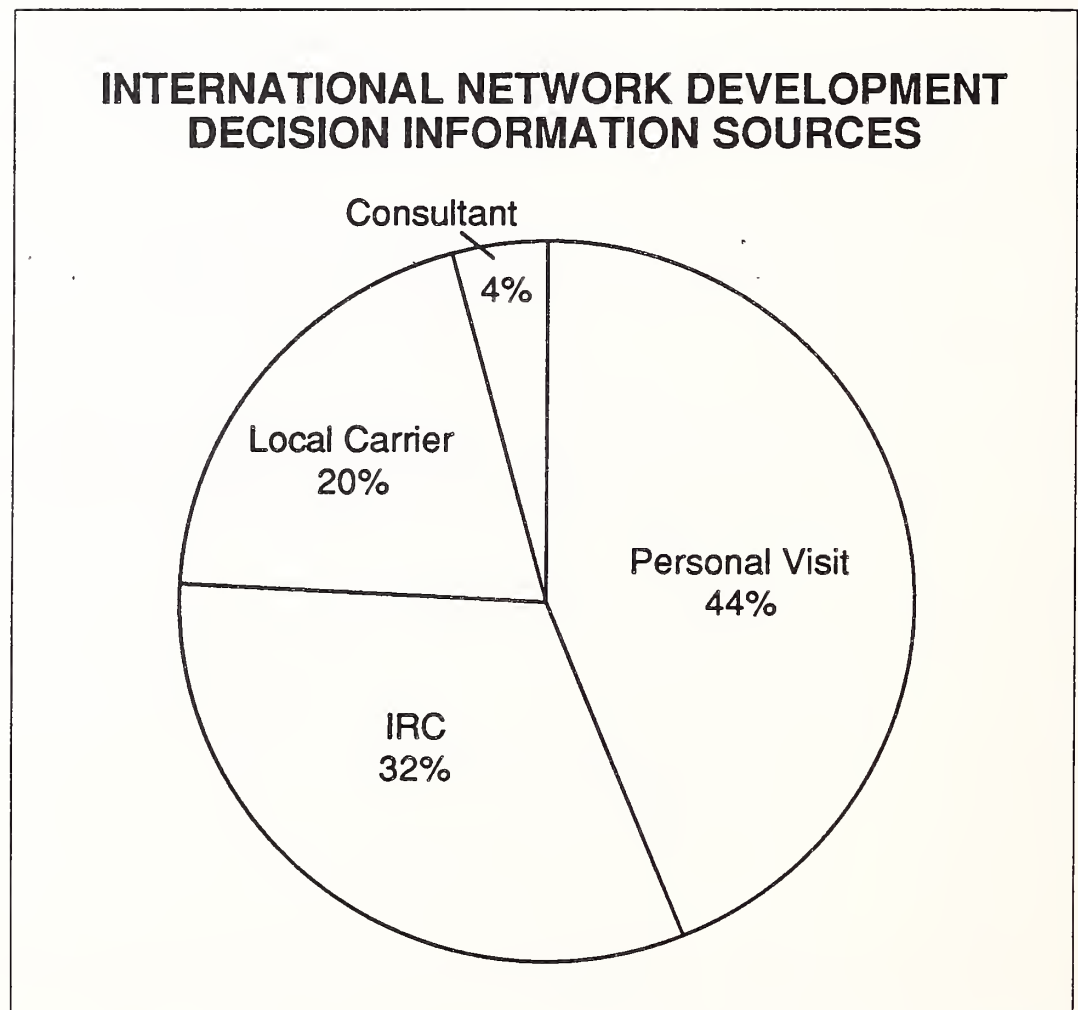
- Headquarters staff have a more comprehensive view of the overall cost picture and therefore perceive the financial benefits more readily.
- The in-country staff tend to be more closely associated with the business and might have a better understanding of the true value of a network.

Following questions to develop an understanding of the importance of an organization's international network, and an understanding of where decisions are made, users were asked to identify the primary sources of information for making decisions about implementing service in a country.

The primary purpose of the question was to assess the degree of up-to-date, accurate information about services available, regulations and general requirements for operating in a country.

As Exhibit III-8 indicates, users generally have only limited knowledge about the services and conditions that exist in a country.

EXHIBIT III-8



These results raise several questions:

- How can individuals that have not visited a country make an informed decision about conditions in a country?

- Are individuals that express concerns about a country's services sufficiently knowledgeable to express the concerns or are they drawing conclusions based on consensus and industry publications?
- Are IRCs that frequently do not have a representative in proximity to the user's headquarters nor a representative in each of the countries fully capable of conveying a user's requirements to a national authority?
- Can the local carriers (used by an estimated 20% of the companies) provide sufficient quality information so that an informed decision can be made?

In many countries, the ability to implement a particular configuration or operate in a specific way is dependent on a thorough understanding of both the needs and requirements and the individual.

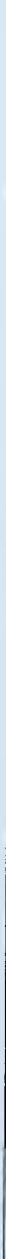
There are a number of examples that suggest that many users might be able to obtain services or operate more effectively if sufficient time were invested to fully explain the needs and requirements and identify alternatives that could be mutually agreed upon.



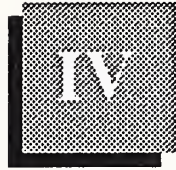




# Regional Services Profile







## Regional Services Profile

### A

#### Introduction

The primary purpose of the regional profile is to provide a summary assessment of the existing services and regulations and key trends in service growth and development for the next five years.

Quantitative data for the regional profile is based primarily on information derived from users, indicating their plans for the next five years.

Subjective information is derived from a combination of user and provider (PTTs) comments, with notes made where there appears to be significant deviation between user projections and provider plans and projections.

### B

#### Business Environment

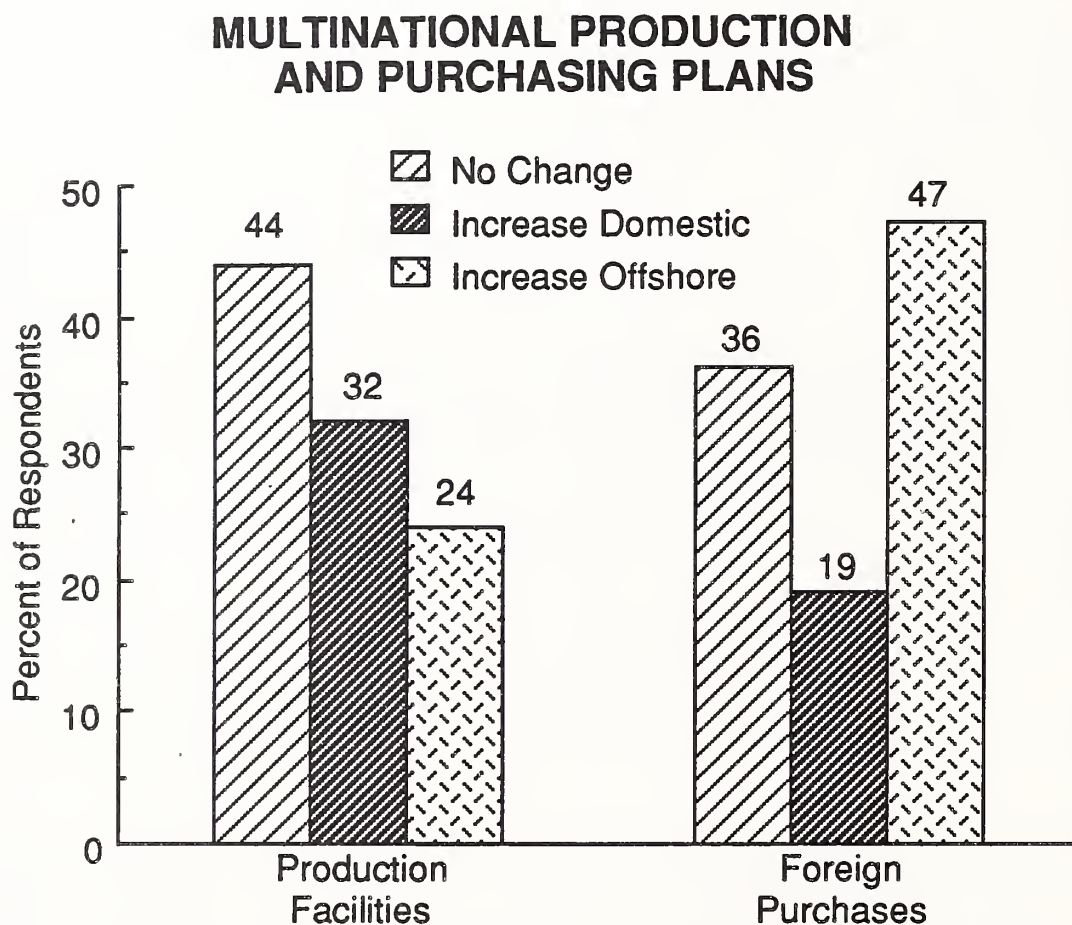
In a report issued by the United Nations, the world economic growth for 1988 is expected to be an estimated 3.9%. For the same period, the overall growth for developing countries is expected to be an estimated 4.4%.

- The percentage growth for developing countries is estimated to be at least one percentage point over 1987.
- The percentage growth for developing countries is estimated to be at least three percentage points over 1986.

While the overall growth of development and trade has slowed over the past several years, there has been a stabilization and most economists believe that the rate of growth in the Asia/Pacific area will exceed the rest of the world by at least one percentage point. This trend is expected to continue for the next several years.

In a study conducted by Boston University to assess trends in growth of domestic and international production facilities and purchases, a number of trends were noted. (See Exhibit IV-1.)

EXHIBIT IV-1



Source: Boston University

- An estimated 44% of the companies indicated they would not change their plans for developing production facilities as a result of changing economic conditions. Thirty-six percent (36%) indicated that there would be no change in their domestic versus international purchasing patterns.
- As part of the same research, 32% of the organizations indicated that they would increase their domestic production facilities and only 19% indicated any significant increase in the growth of domestic purchasing patterns.



- Of particular interest is that 47% indicated that they would increase their foreign purchases.

While there are constant changes in decisions to develop services and facilities at home or abroad, it is interesting that at least a quarter of the companies indicated a continued expansion of production facilities overseas and nearly half indicated that they would increasingly look outside the United States for sources of supply. With these trends is a corresponding growth in need for international telecommunications services.

Whether countries will be able to support the increasing demand for telecommunications services is highly dependent on the level of development in the specific countries. However, several trends indicate that substantial resources are being devoted to the development of facilities and services throughout the region.

- Countries in Asia are spending a greater proportion of their national resources than any other area of the world. Collectively, they are spending an average of 6.1%. The next highest area is Africa with a 6.0% expenditure rate.
- Among the countries ranking highest in national expenditures for telecommunications facilities and services, three Asian countries rank among the top twenty.
  - Between 1987 and 1988, the level of expenditure for national development in Japan is projected to grow by nearly 13%.
  - In Korea, the increase in national expenditure between 1987 and 1988 is projected to be nearly 20%.
  - In Taiwan, the increase in expenditures is projected to be nearly 28%.

Countries in Asia are expected to continue to grow and allocate increasing funds towards the development of national telecommunications resources.

Overall, the business environment for telecommunications is expected to continue to be favorable. Though many of the regulations will remain, organizations either entering or expanding in the region can expect to find national providers increasingly receptive to new services and new ways of conducting business.

## C

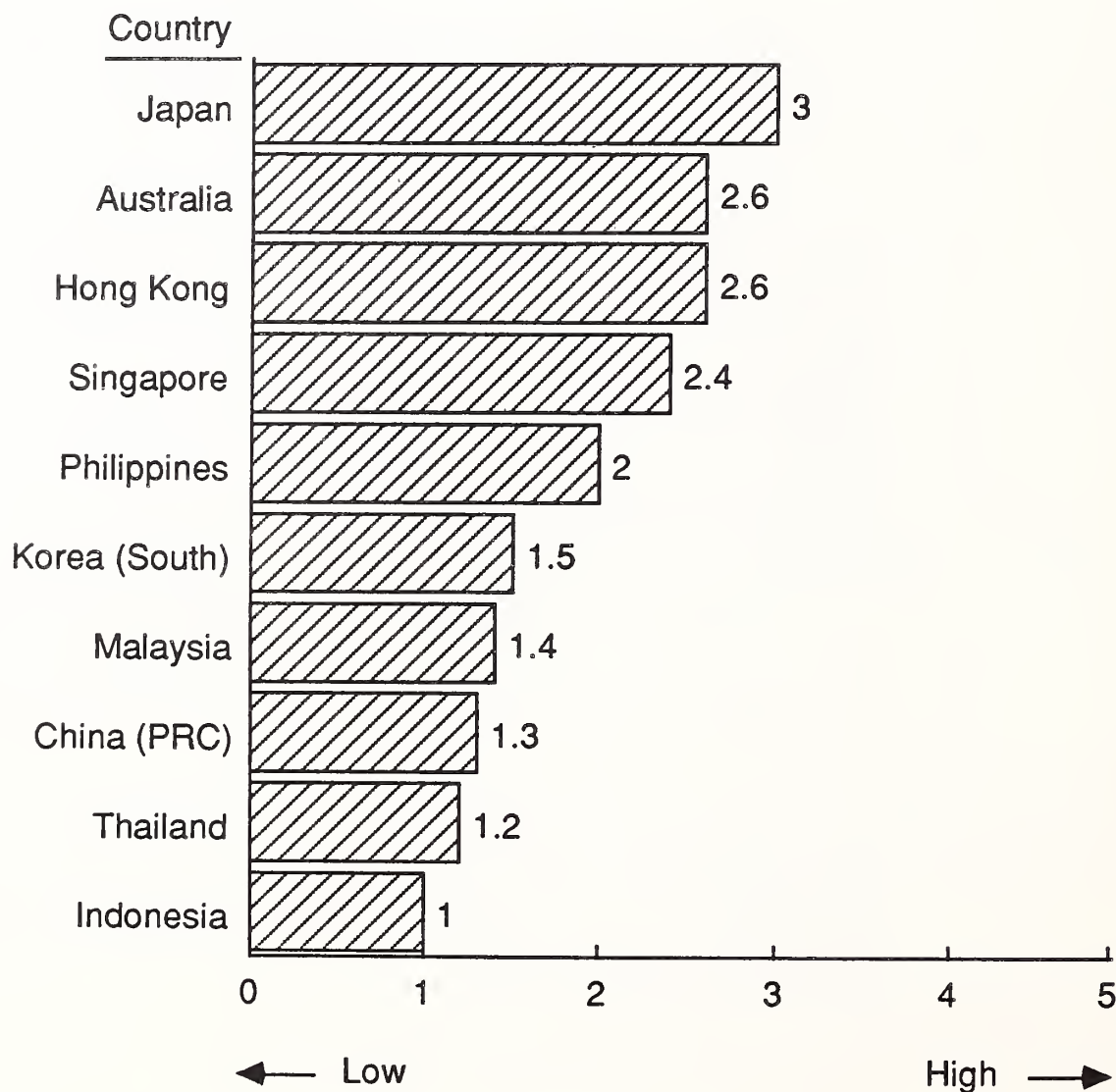
Regulatory  
Environment

The regulatory environment in the Asia/Pacific region can be best characterized as a montage, with rapid changes in some countries and little, if any, change in others.

As indicated in Exhibit IV-2, users are generally highly aware of the progress of deregulation in Japan. Though their overall ratings place Japan at the top of the list in the amount of progress made, the perception is that the region is still highly regulated.

EXHIBIT IV-2

## DEGREE OF DEREGULATION



As can be seen, none of the countries rated higher than average (3.0) in the degree of deregulation that has been accomplished, indicating that there are still a high number of regulations in most of the countries. In over half the countries shown in exhibit, the regulatory environment is still considered very restrictive.

An exception to the ratings might have been New Zealand, had it been included in the formal survey process. The degree of deregulation that has been accomplished in the last two years has been significant. However, the extent of deregulation in New Zealand might not be recognized by many since there are generally few companies that have a large telecommunications presence in the country.

In the past year, the regulatory environment in New Zealand has progressed from a highly regulated environment to an environment of only minimal regulations.

## D

### Service Developments and Forecasts

#### 1. Introduction

Information included in the Service Developments and Forecasts part of the report is based on information derived from user projections of growth in services and on information from the providers about development plans. Since country plans are specific to a country, the information has been summarized to reflect trends in the region.

#### 2. Voice Services

For the purpose of the report, voice services are divided into two general categories—basic telephone and cellular telephone.

In the majority of the countries, basic telephone services are well developed and are viewed increasingly as a utilitarian device to which there is little attention paid. The presence of basic telephone service is as accepted as the presence of electricity.

However, this is not true in all countries. Exhibit IV-3 identifies countries in which even basic telephone service is significantly deficient. In these countries, the development of basic services is a high priority, frequently to the exclusion of the development of services that are increasingly needed by businesses.

However, even in the countries where basic telephone services are needed, there are a number of considerations concerning the use of services by international businesses.



## EXHIBIT IV-3

**COUNTRIES REQUIRING BASIC  
TELEPHONE SERVICE DEVELOPMENT**

- China
- Indonesia
- Thailand
- Malaysia
- Philippines

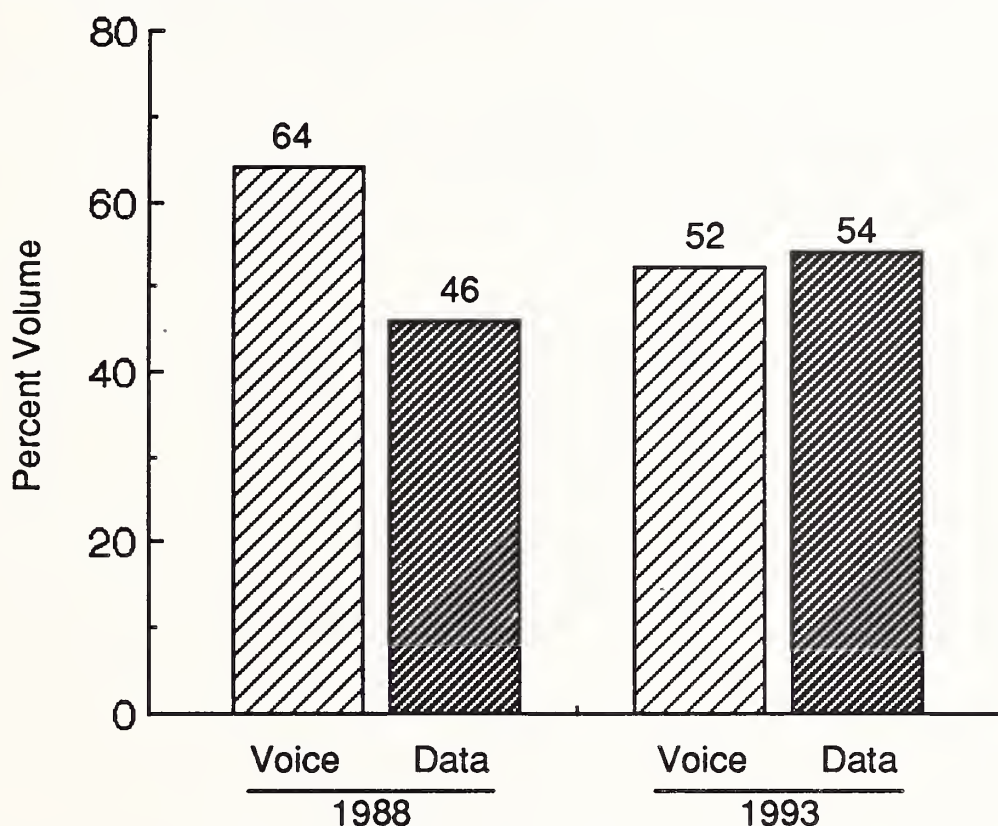
- Most users consider international services provided in even the less developed countries to be acceptable—at least from the metropolitan areas. Users consider international services to be better than domestic services.
- All of the countries provide some level of International Direct Distance (IDD) dialing services. Even in China, one of the least developed countries, international dialing from Beijing and Shanghai is considered to be good quality.
- In a number of countries, access to international services is through separate switching centers and even separate national networks.
- In several cases, switches have been installed at key local switch centers where international calls are then relayed over a separate domestic network to an international gateway. International services are therefore not subject to many of the same conditions.

Users were asked to indicate the proportion of their international traffic today that is voice and the proportion that is data. They were then asked to project the proportion of their international traffic that will be voice and data five years from now. The results are shown in Exhibit IV-4.

Results of the question indicate a gradual trend towards increased use of data transmission as compared to voice transmission. The key reasons given by users include the following:

- Generally, there will be an increase in the volume of data traffic as processing activities are increased.

## EXHIBIT IV-4

**INTERNATIONAL VOICE AND DATA TRANSFER\***

\* Figures do not add to 100% due to rounding

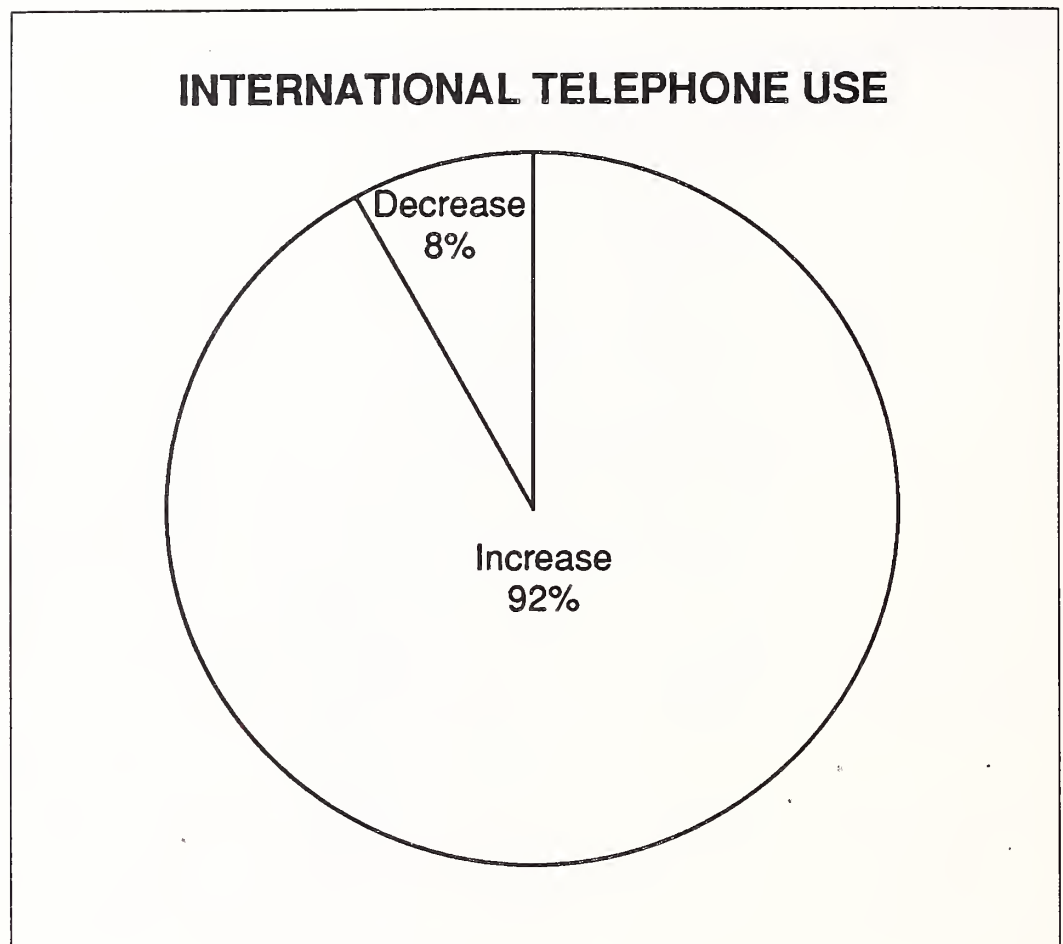
- Voice traffic will be increasingly replaced by facsimile and electronic mail.

Users were asked to indicate the increase (or decrease) in telephone use over the next five years. Of all the users surveyed, 92% indicated that their voice traffic would increase over the next five years.

Only 8% of the users surveyed indicated that volume of their voice traffic would decrease over the next five years. Those that indicated a decrease are organizations that are in the process of consolidating their international operations and even closing some of their offices in the Asia/Pacific area (Exhibit IV-5).



EXHIBIT IV-5



When considering the projected increase in telephone use over the next five years, the net increase was determined to be approximately 38%. This increase is for voice telephone traffic and does not include the use of the telephone network for facsimile transmission or other uses such as the connection of a terminal to a public network.

Increasingly, telephone costs are being driven by the increasing use of facsimile. Facsimile is one of the fastest growing services in the region and the primary reason for the rapid growth in telephone costs.

With only one exception, users project the volume of facsimile will continue to increase over the next five years.

- One organization that has been consolidating its presence in the Asia/Pacific area projects a decline in the use of facsimile at a rate of approximately 8% per year.
- Overall, users indicate that the use of facsimile will increase at a rate estimated to be approximately 12% per year. The overall growth of telephone services closely approximates the projections provided by national services organizations, which project an average annual growth of approximately 15%.

Cellular telephone services are also growing at a significant rate in most countries in the Asia/Pacific area. Overall, cellular telephone services are projected by the national providers to grow at a rate estimated to be approximately 20% per year.

There are a number of factors to be considered regarding the growth of cellular services.

- In many countries, the demand for cellular services is exceeding the ability to provide the services. Several representatives of the national authorities indicated that they had underestimated the demand for cellular services.
  - In one country, the provider estimated an initial application rate of 300 subscribers and more than 3,000 were received in the first two to three weeks. The current backlog of service requests is over 10,000 and the processing of applications has been suspended until more service facilities are available.
  - In another country, though the initial demand was not excessively higher than anticipated, there is a current backlog of more than 20,000 applications that cannot be processed due to a lack of capacity.
- Aside from the convenience associated with cellular telephones, users indicate that, in many cases, they receive a higher quality of service through cellular telephones than through standard service facilities.
- The major concern of users is that cellular service is not available nationwide. However, in Thailand, the national carrier indicates that consideration is being given to establishing a national cellular service as a means of accomplishing short-term upgrades to the national network.

Both users and the national authorities indicate that cellular services will grow in importance. However, digital cellular service (the use of data terminals on the cellular network) is not considered important at this time. Few of the national authorities have given even moderate consideration of the use of the cellular network as a means to transmit data.

In the majority of the countries, providing detail invoices for telephone use is either already provided or considered an important future service. With one exception, the providers indicated that they have the capability to produce detail billing statements.

- In the PRC, detail billing services are currently not available and are not expected to be available in the next few years.

- One possible exception is the metropolitan area of Beijing, where facilities are becoming increasingly modern.
- Any service introduced would be very limited, since the ability to transfer and consolidate data between provinces is highly questionable.
- Indonesia indicates that it does not currently provide such a service and does not plan on introducing one. It believes that this type of information is unnecessary and would result in an excessive amount of paperwork.
- Both Malaysia and Hong Kong recognize billing information services as a source of revenue. Authorities in Malaysia currently charge M\$1.00 for detail statements for residential customers and M\$2.00 for detail statements for business.
- Authorities in Hong Kong recognize that producing detail statements could be a source of revenue and will consider a possible service at such time as there is sufficient demand. To date, there has been little customer demand. The primary reason is that there is no charge for calls within the colony.

### 3. Text Services

Text services consist of three general categories—telex, facsimile, and electronic mail. With one major exception, the volume of telex use is declining, being replaced slowly by facsimile and electronic mail services. Although telex will remain a key service medium throughout the region for some time, facsimile and electronic mail will become increasingly important mediums for text transmission in the more developed countries.

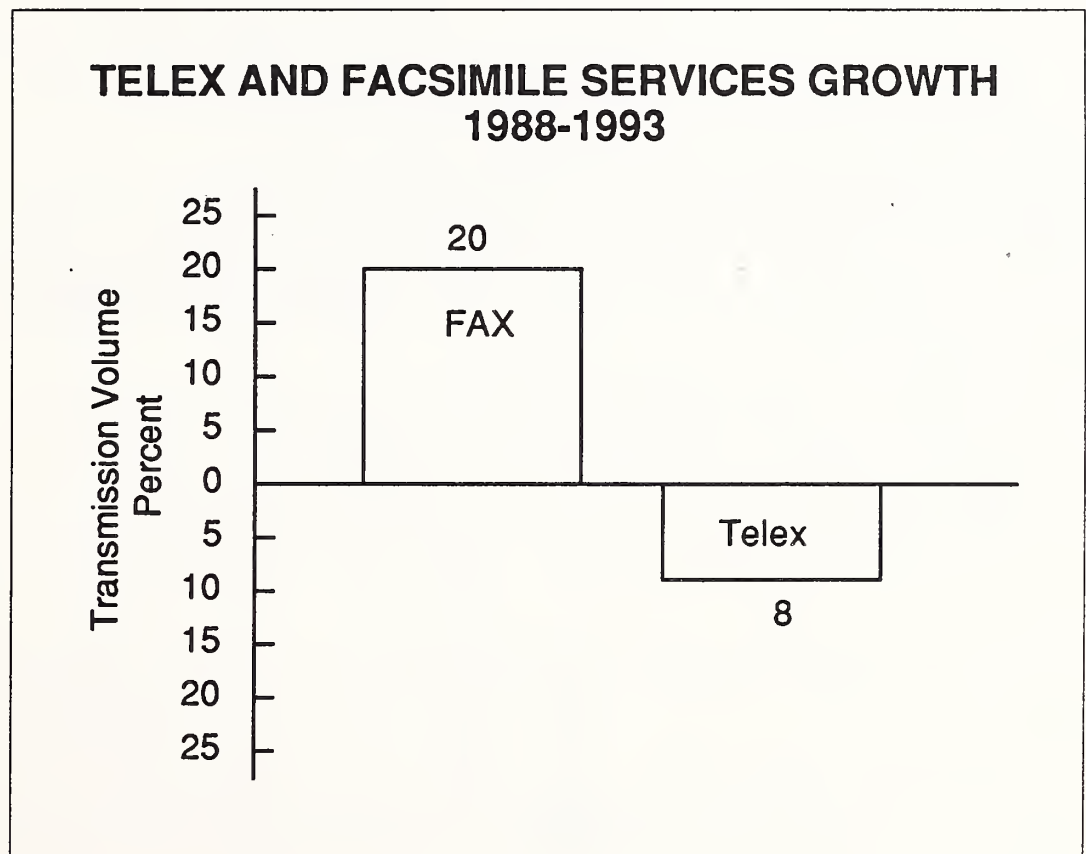
- The notable exception to the declining trend in telex services is the PRC, where telex services are continuing to be developed. Development will continue for some time, due to the need to process ideographic characters.
  - The government has placed considerable time and effort into the development of transmission and printing capability for the Chinese alphabet.
  - The government is continuing to develop national switching centers for telex, as development of the national infrastructure begins to expand to the less developed areas of the country.

- In addition to the PRC, development of telex-based services is being carried out by providers in the Philippines, where the national infrastructure is also badly in need of a wide variety of services.

Regionwide, users and providers generally agree that telex services will decline at a rate estimated to be approximately 8% to 10% per year.

While the use of telex services is generally declining, text transmission is continuing to increase through a growing use of facsimile and electronic mail. However, until connectivity between international public networks is achieved, facsimile use is expected to grow at a rate somewhat faster than the use of electronic mail. Exhibit IV-6 provides a comparison of the projected growth rates of facsimile and telex over the next five years.

EXHIBIT IV-6



Electronic mail is projected by most users and providers to be the most needed value-added service regionwide and will be the key contributor to the growth of value-added networks for the next few years.



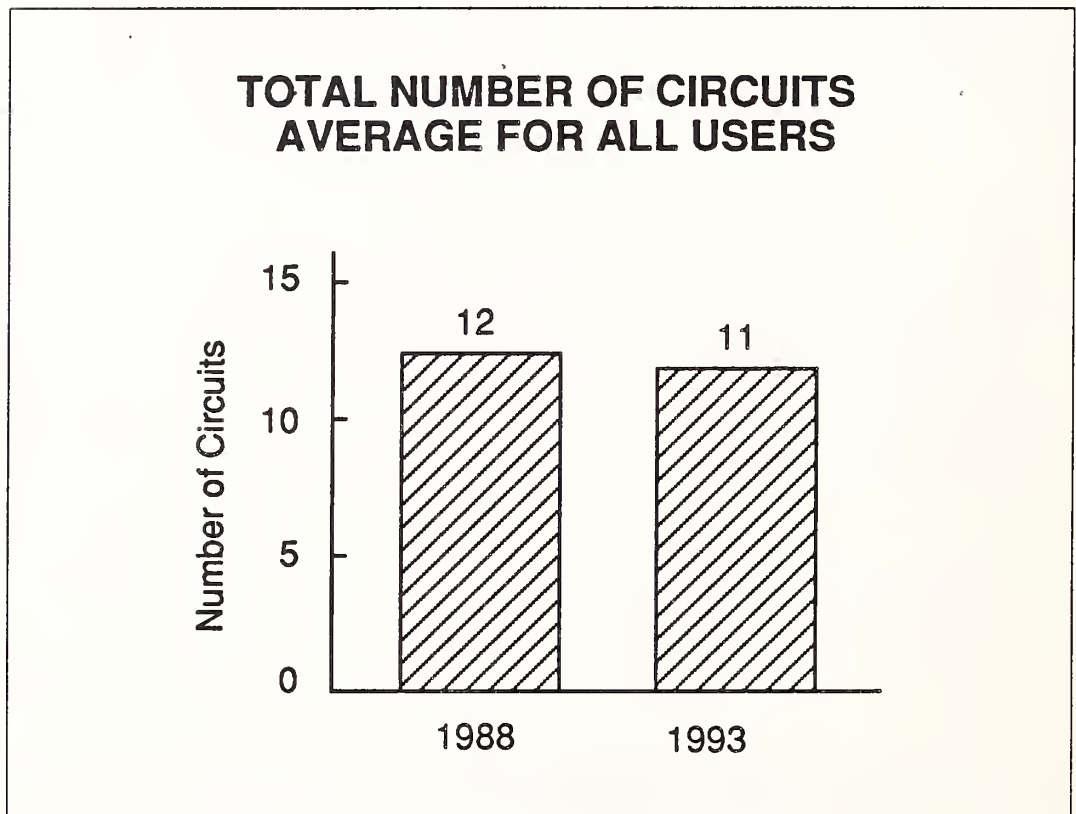
#### 4. Leased Circuit Services

Leased circuit services currently account for an estimated 80% of the network cost for most users. Although percentage is expected to continue to be weighted towards leased circuits for at least the next several years, the type of circuits needed by users is changing.

To assess the types of services that are in use today and those that will be required in the future, users were asked to identify the total number of circuits that are currently installed. Since the purpose of the question was to establish a base for assessing change and not provide an accurate count of the number of circuits, users were asked to define their network by means generally acceptable in their organization.

Exhibit IV-7 shows the number of circuits regionwide today as compared to five years from now. There are several key points to note from the numbers indicated.

EXHIBIT IV-7



- Only nominal change is expected in the overall number of circuits projected by users over the next five years.
- Considering the overall growth in the region, installation of new circuits will be balanced by reduction in others or in revision to circuit structure to achieve overall cost effectiveness.



- As indicated below, there will be a shift to the use of higher-speed circuits to replace lower-speed circuits currently implemented.

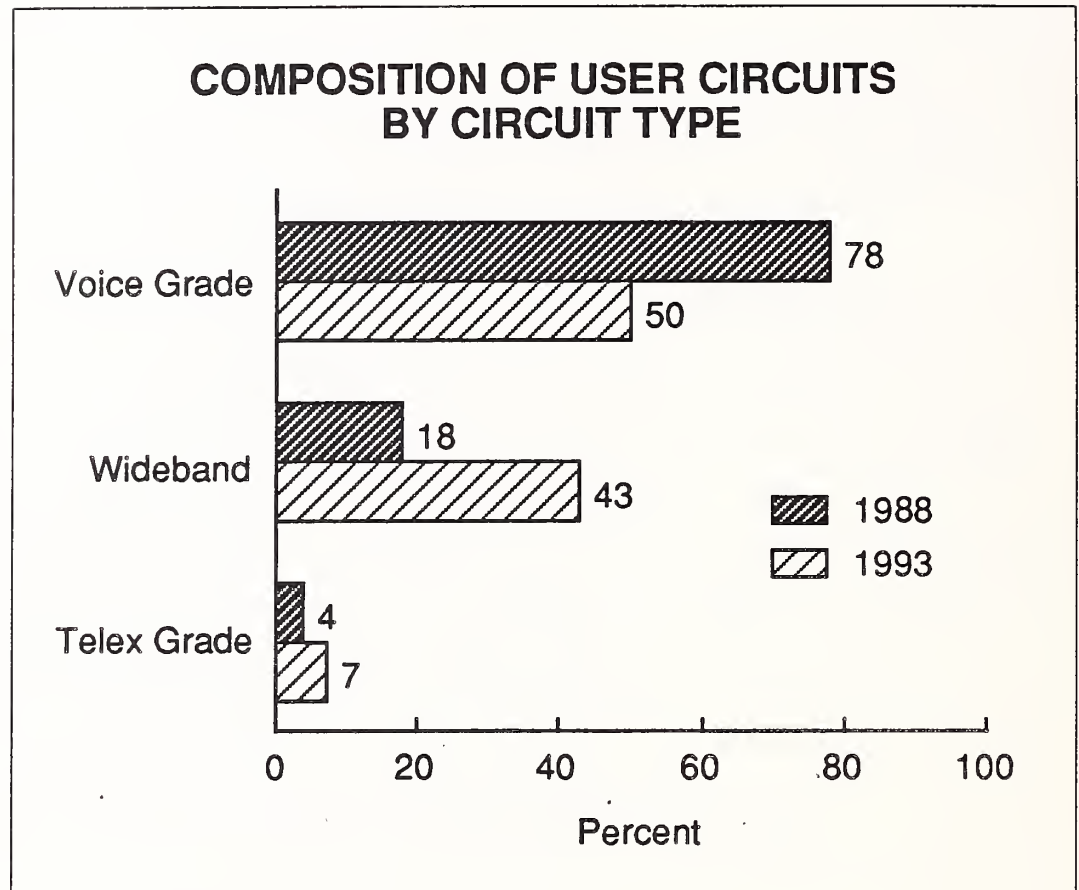
Over the next five years, there will be a significant shift in the types of circuits used by major users in the region. Based on a weighted average calculation of the number of circuits currently installed, a definite trend to higher-speed circuits is noted. Exhibit IV-8 indicates the current percentage of circuits by major category.

- While there will continue to be a need for lower-speed circuits to provide services to less developed areas, there will be continued shift from the use of lower-speed (teletype grade) circuits. The figures indicate a slight increase because one user plans to increase use of low-speed circuits into a number of lesser developed countries. The company currently has little demand for higher speeds.
- Users indicate that their use of voice-grade circuits (2400-9600 bps) circuits will decrease by an estimated 36% over the next five years. Though the use of voice grade circuits will continue to grow, there will be a trend to the use of higher-speed circuits to provide service over major transmission routes. Users indicate that voice-grade circuits will account for an estimated 50% of their circuit needs as compared to approximately 78% today.
- Users indicate that use of wideband circuits (50 Kbps and higher) will make up a greater share of their networks five years from now. Currently accounting for an estimated 18% of the total number of circuits, wideband circuits will grow by an estimated 139% over the next five years to account for an estimated 43% of their total circuit requirements.

There are several reasons cited by users for the shift from lower- to higher-speed circuits.

- Organizations are continuing to make on-line services available directly to offices, irrespective of their geographic location.
- Systems integration is a continuing trend in large organizations. With the increased integration of services, there is a greater demand for the use of networks to provide a wider variety of corporate data.
- With the increased need for data, there is a corresponding increase in the volume of data transmitted, requiring higher transmission speeds.

EXHIBIT IV-8



- With the increased availability of higher-speed services, users are obtaining greater flexibility in determining how networks are used. Circuit composition can be varied to meet changing needs, and capacity is provided to be able to expand more quickly when new circuit options are identified.

Users and providers in the region generally agree the trend toward higher-speed circuits will continue for the next five years.

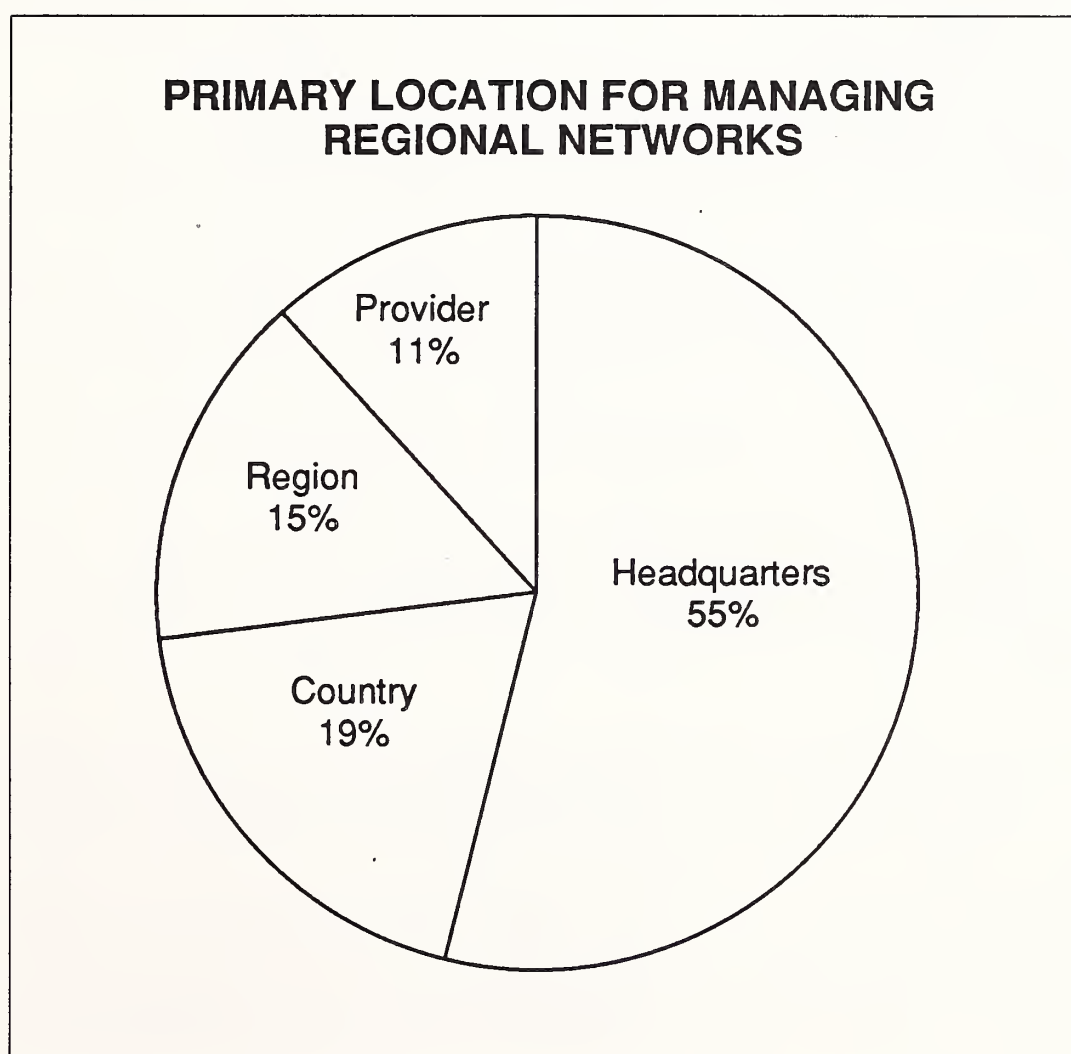
- In countries where wideband or IBS service is available, providers indicate that the growth rate will be an estimated 10% to 15% per year. With the exception of two users that are in the process of consolidating their services in the Asia/Pacific area, users also project an estimated increase of approximately 10% per year.

Network management remains a key concern to most organizations. With international networks becoming increasingly critical to the success of the business, effective management of the network is an increasing requirement.

As Exhibit IV-9 indicates, the majority of users manage their Asia/Pacific network from their headquarters location. The reasons given for maintaining control at the headquarters location were generally consistent. Users cited the following reasons.

- **Lower Cost** - Users generally agree that managing a network from a headquarters office is the most cost-effective.
- **Better Control** - Users generally agree that managing a network from a headquarters office provides the greatest degree of control. Control was a key element in organizations whose services are becoming increasingly integrated and the corporate networks more complex.
- **Better Coordination** - As with control, users believe that a high degree of coordination is needed as networks become more complex.

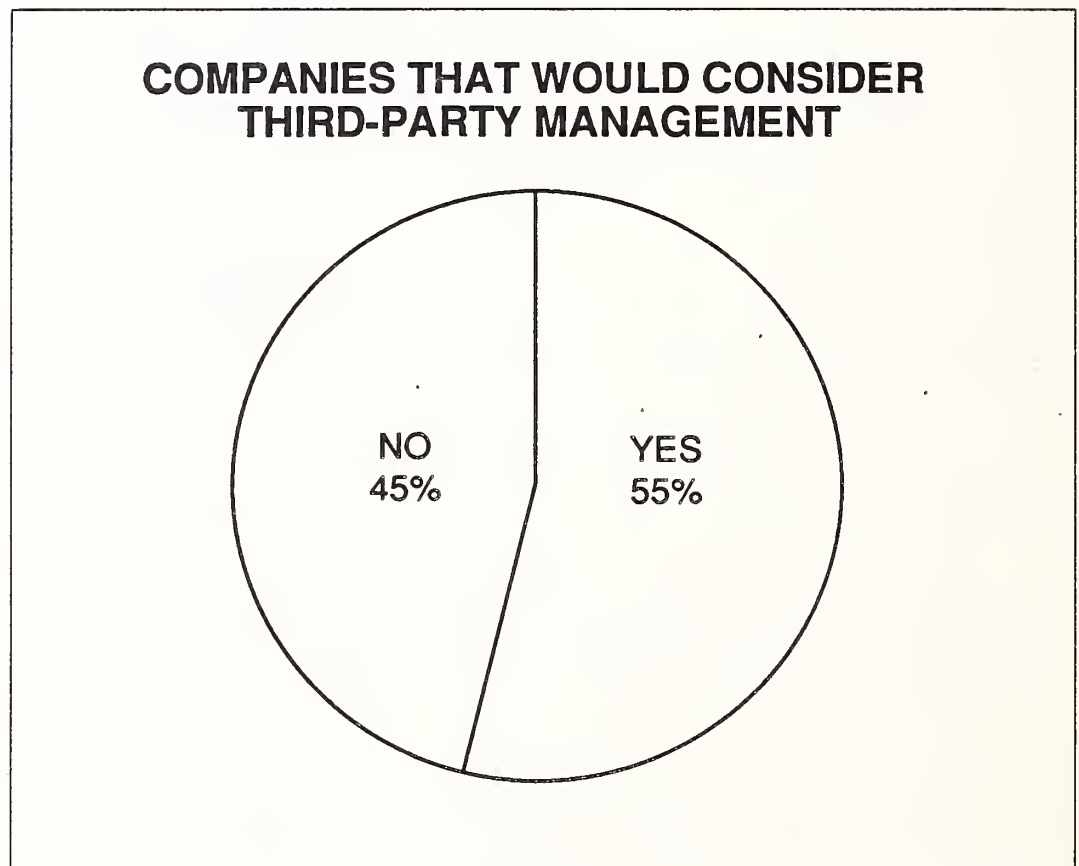
EXHIBIT IV-9



Although the majority of users still believe that headquarters staff can provide the most effective network management services, the trend could change over the next few years.

As part of the research, users were asked to indicate whether they would consider having a third party perform network management services in the Asia/Pacific area. As indicated in Exhibit IV-10, a significant number of users now consider network management by a third party to be a viable option, assuming that the costs are acceptable.

EXHIBIT IV-10



There were several factors users cited that they would consider regarding third-party network management. Reasons for third-party management included the following:

- The region is too far away for us to be able to manage effectively.
- Third-party management provides an opportunity for improved management.
- A third party could probably do a better job than our limited corporate staff.
- Using a third party could improve our flexibility to meet future needs.



- A third party could provide increased network reliability.
- Third-party management would reduce corporate resources.
- Using a third party would reduce our management costs.
- Using a third party would ensure that we had more experienced people.

Although there were several reasons cited for interest in considering a third party for network management, there was only one significant reason given for not considering third-party management to be an attractive alternative.

The reason cited for not wanting to consider a third-party agreement was increased control. The estimated 45% of the organizations that would not consider a third party consider internal control to be a high priority in the overall management priorities.

An additional area that was considered with users of leased circuits services was whether there would be any trend in the Asia/Pacific area to levy a volume tariff on the use of leased circuits as an encouragement to use public network services.

None of the providers indicated any trend toward adopting volume charges for the use of leased circuits, and users generally do not consider this to be a significant factor in the region.

## **5. Public Data/Value-Added Network Services**

The growth and use of public data networks is one of the most significant forces in the Asia/Pacific region and is likely to remain so for a number of years. Domestic or international services are currently being used in all countries included in the survey, with international services being the predominate requirement.

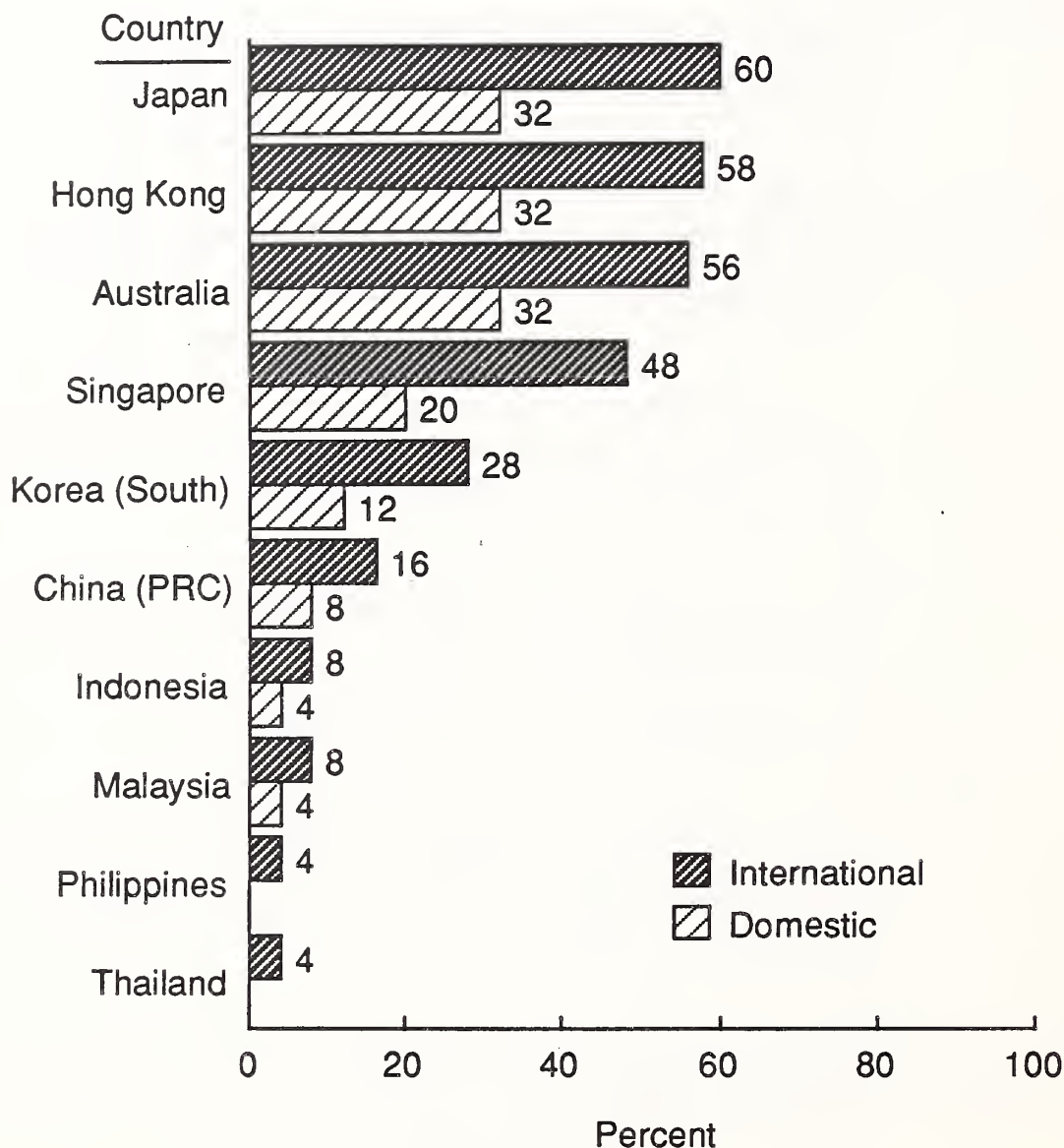
Exhibit IV-11 provides a summary of the use of domestic and international public network services in each of the countries included in the survey. (New Zealand was not included in the numerical surveys, but usage in New Zealand is reported to be very low.)

Of the countries included in the survey China, the Philippines, and Thailand do not currently have domestic public data networks and in Malaysia and Indonesia network use has not been significantly promoted.



EXHIBIT IV-11

### PUBLIC DATA NETWORK USE BY COUNTRY DOMESTIC/INTERNATIONAL

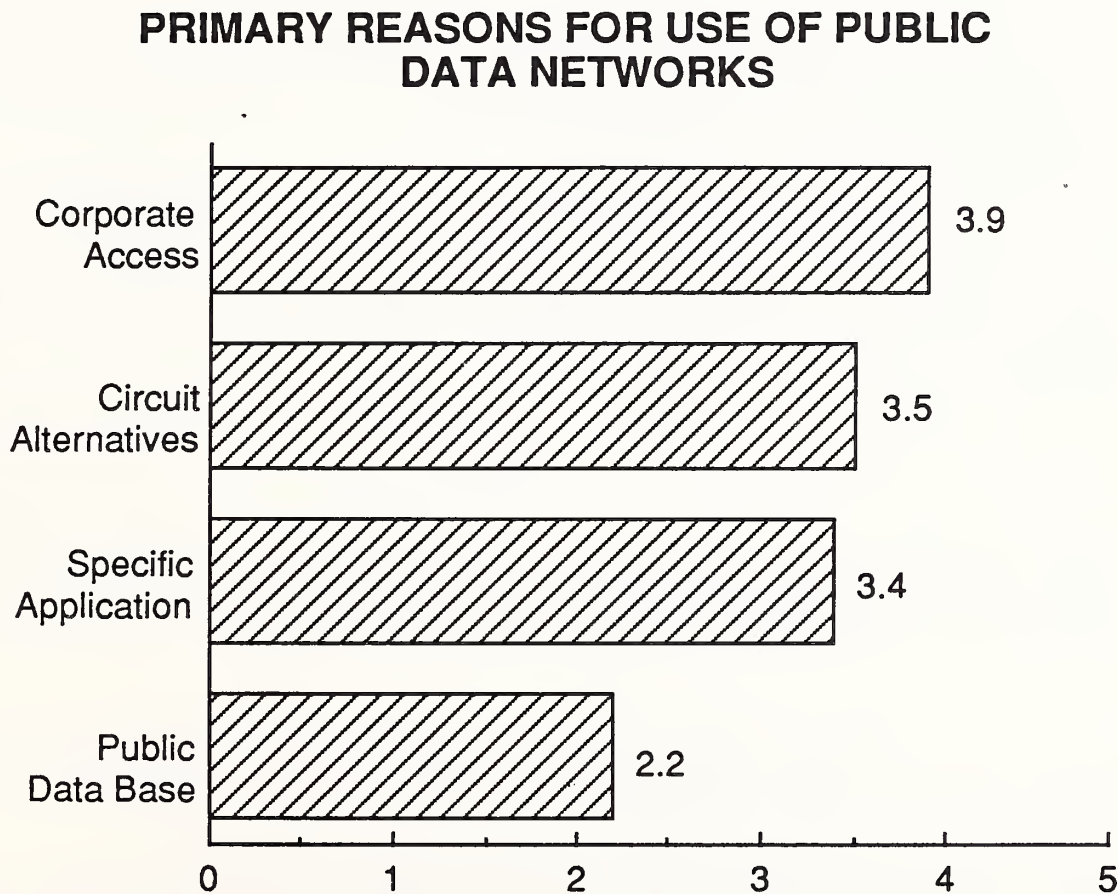


In China, a national public network is planned for implementation within the next two years, however indications are that the primary purpose will be for use by the government and there will be little commercial promotion. Access to international services from the domestic network will be through a node located in Paris.

In Malaysia and Indonesia, the national providers indicate that they will be beginning to promote the use of their national network within the next year. Both indicate electronic mail is the most significant need. In Indonesia, the most significant problem with building usage of their domestic network is the lack of domestic circuits to provide connections to the network. Both telephone and leased circuits are in short supply and are expected to remain so for the next several years.

Among the questions asked of users was the primary reason for using a public data network. They were asked to rate, on a scale of 1 to 5, the degree of importance of several reasons. The results are summarized in Exhibit IV-12.

EXHIBIT IV-12



- Among the reasons, access to corporate systems was rated highest among the alternatives provided. Since all of the users included in the survey currently have leased circuits, corporate access was concluded to be to supplement leased circuit services or to gain access to a corporate service that was used only occasionally.
- Use of a public network as an alternative to leased circuit ranked second among the reasons for selecting a public network. Users indicate that use of a public network is considered a viable alternative in areas where there is not sufficient volume to justify a leased circuit.
- While public network use for a specific application ranked third among the reasons, the rating indicates that use of a public network for a specific application is nearly as important as corporate access and use as a circuit alternative.
- Use of a public network for access to commercial data bases received the lowest rating among the alternatives. Generally, unless there is a specific research need, users indicate that commercial data base access is not a high priority.

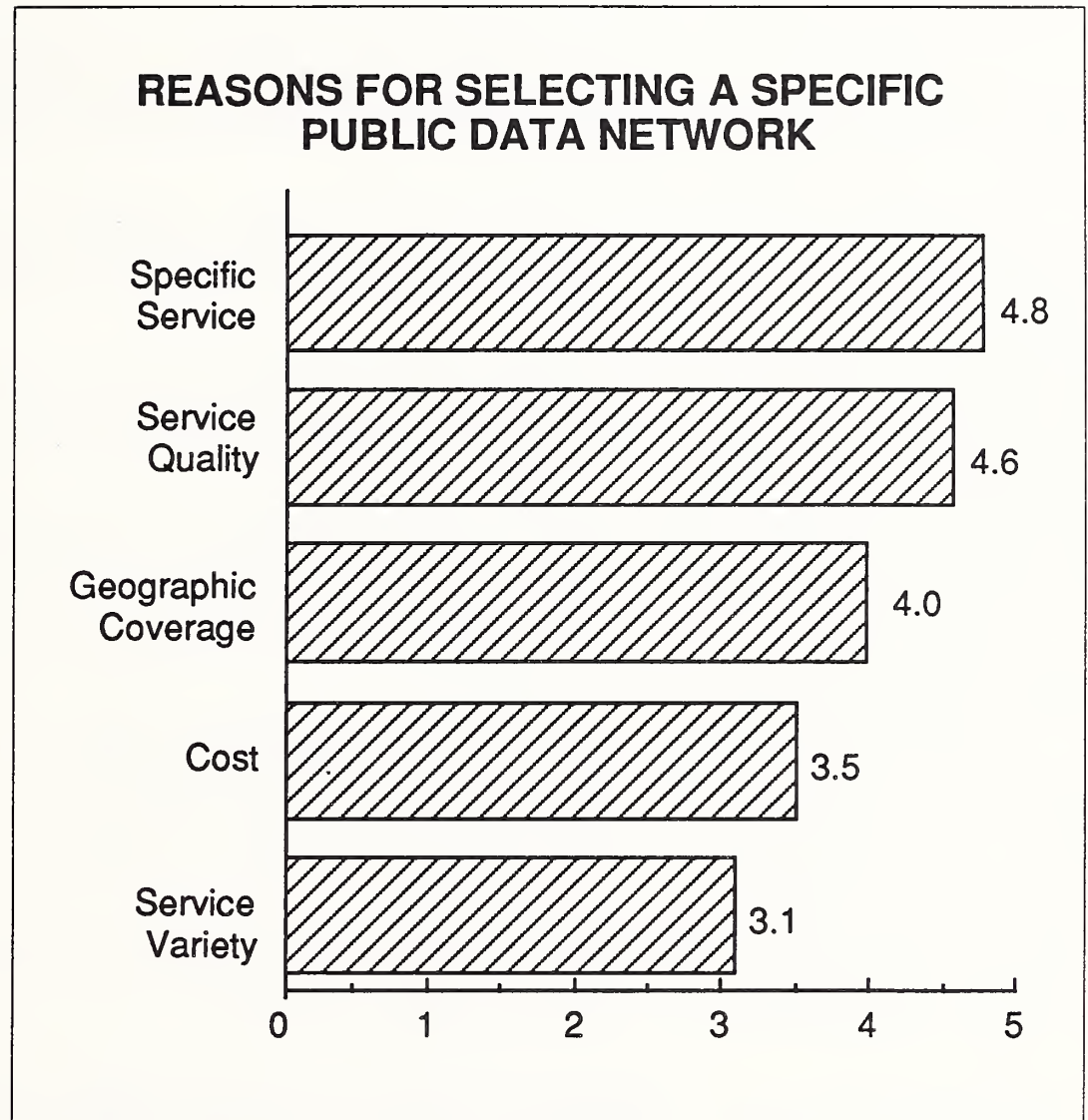
Users were also asked to provide a rating for reasons for selecting a specific network provider, when a selection alternative was available. The research recognizes that alternatives are not always available in foreign countries. Exhibit IV-13 provides a summary of the key responses.

From the ratings provided, there are a number of observations that can be made.

- Users generally select a provider for a specific service. The fact that a provider can offer a wide variety of services is not sufficient reason for selection. The specific reason most frequently mentioned was electronic mail services.
- Service quality is generally equally as important as the service provided. A slight difference was noted, but the difference is not great enough to suggest any real difference in importance.
- Geographic coverage is also generally important to users. With business expansion to an increasing number of countries, the ability to provide the most needed services to an increasing number of countries will be of increasing importance.
- Relative to other factors, service cost is not a major consideration with most users. Although cost is a factor in all decisions, users are increasingly interested in functionality and are less concerned about the cost than the availability and the quality of the service.



EXHIBIT IV-13



Considering the recent trend in Europe to 'encourage' organizations to use public data network services, users were asked whether they are aware of any pressure on the providers to convert to public network services.

- National providers indicate that they do not place any pressure on users to select public network services as an alternative to leased circuits.
- Users generally agree that there is little encouragement today to use public data network services as an alternative to leased circuits, but they think this will change.
- Approximately 76% of the users believe that providers will place increased emphasis on encouraging users to select public networks as an alternative to leased circuits. The predominate reason given is that public networks make better use of resources and therefore provide greater profit opportunity for the providers.

From information gathered from users and providers, INPUT believes that the trend of encouraging the use of public networks will grow; however, the form of the 'encouragement' will be indirect rather than direct.

- Providers will increase their emphasis on expanding the number of services available, particularly as network connectivity becomes a reality.
- Providers will increase their promotion of network services. When asked about services available, the providers will tend to provide information about leased circuit services only on specific request.
- The providers could also place emphasis on providing network services by ensuring reduced installation and service times for network services as compared to other services. Generally, users will learn to expect a higher level of service for public network services.

A key indicator of the extent that public networks will be emphasized by the providers is the difference in growth projections from users and providers. As indicated in Exhibit IV-14, the providers believe that public network use will grow at a significantly higher rate than do users.

Users generally believe that services will continue to grow, but at a steady rate estimated to be 10% to 12% a year. The providers indicate a significantly higher growth rate.

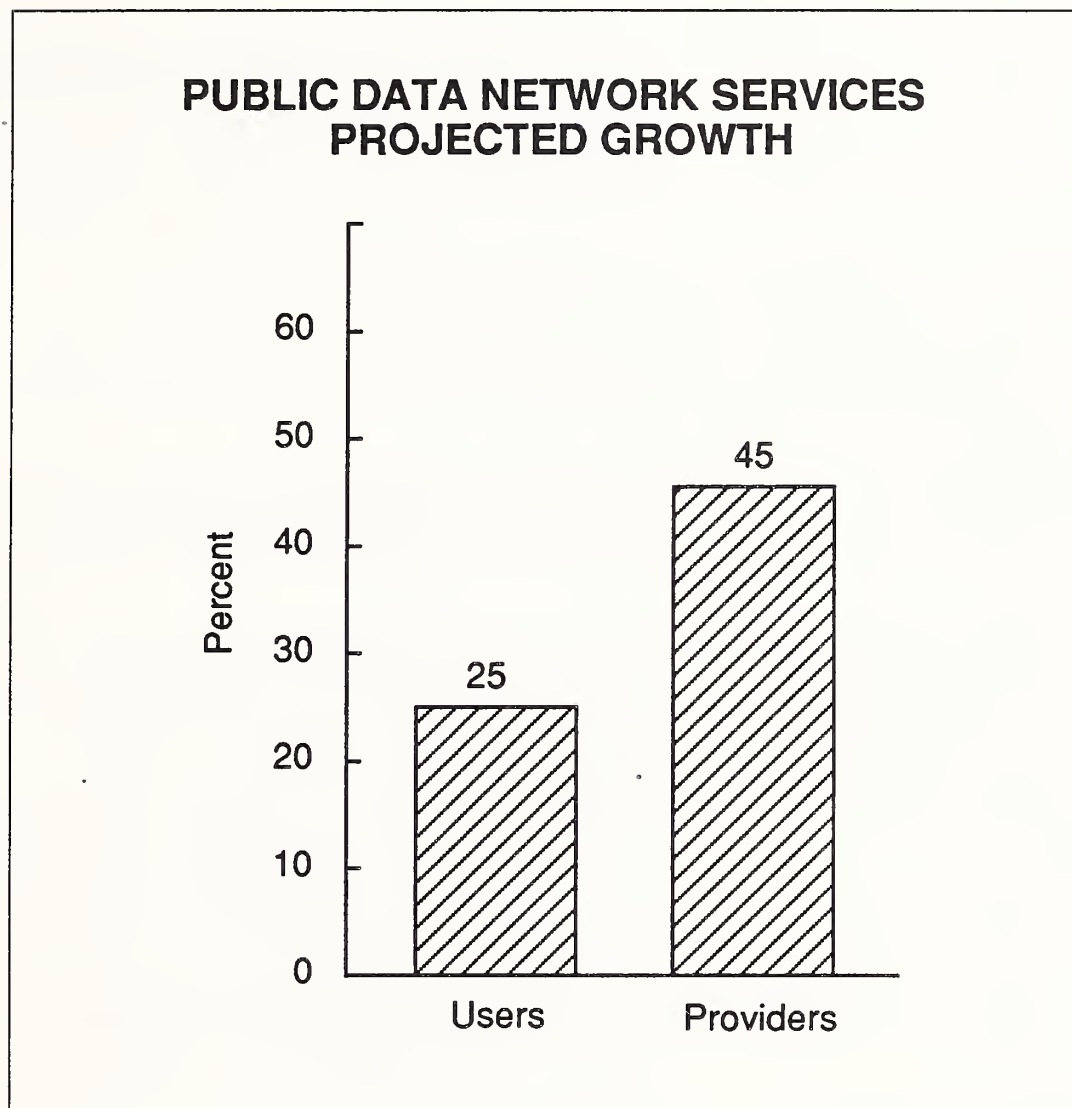
Recognizing that the base of users is small in some countries, providers indicate that growth could exceed 100% per year for the next several years as emphasis is placed on developing the service. The estimate indicated for the providers is INPUT's estimate of the provider projected growth. The estimate is intended to balance the projections of 20% to 30% by some countries with better developed services and the 100% to 150% estimated by some providers with less-developed services.

Both users and providers were asked to indicate the public network services that are most needed. From providers and users, two services were universally mentioned. Users added a third consideration that they consider critical. The services most often mentioned were the following.

- Network Connectivity - Users are increasingly in need of the ability to interconnect the services of one network with the services of another network.
- Since users frequently have little choice of the international provider that is used by a national provider, users need the ability for data to be passed from one network to another.



EXHIBIT IV-14



- Providers do not have the same sense of need regarding network connectivity; however, they acknowledge user need for this type of functionality.
- Electronic Mail - Electronic mail is the most frequently mentioned service by both users and providers. However, the providers indicate that the basic E-mail services need to be enhanced to be of real value to users. They are interested in opportunities to enhance services and are less interested in adding services that provide the same level of functionality.
- Electronic Data Interchange - EDI is the second most frequently mentioned value-added service. Although EDI is just beginning to grow, its value is widely recognized and it is believed to be a key service by many of the providers.

To assess whether there are any new services emerging, users and providers were asked to identify whether there were other value-added network services that were needed but not currently available. Increased network security was indicated as one area, but there were no other new services that emerged as significant considerations.

## 6. ISDN Services and Developments

To providers in the Asia/Pacific area, ISDN is as much an enigma as it is to users and providers in other countries of the world.

- Providers generally agree that there are benefits to the introduction of ISDN services and in some cases can identify general areas of applications, but they generally relate to overall improvement and increased telephone 'POTS' services.
- Users also agree that there are benefits to the introduction of ISDN, but they are not able to identify specific services that are needed that cannot be obtained through other means.
- Although providers in the more-developed countries agree that they will continue to develop the basic infrastructure for providing ISDN services, they also generally agree that users will need to make their requirements known before services can be introduced.

ISDN will continue to grow in the region, but growth will be slow. INPUT believes that growth of ISDN will follow a pattern similar to the pattern in the United States.

- Providers will develop the infrastructure and wait for users to identify specific applications that are needed.
- The initial introduction will be in two basic forms. Initially, wide national highways will be made available. This will be followed by the introduction of a limited number of specific services.
- Over time, services will be introduced as 'service sets' based on ISDN, but they will not be identified as ISDN service.

## 7. Other Services

Among the services needed by providers in the Asia/Pacific area, software is one of the increasingly key elements. Software is needed by developing countries to perform network development and control functions and to provide customer support services.

In addition to basic software to provide control and service, two additional types of software are expected to become increasingly important. These two additional types will be needed by more developed countries.

The types of software needed by developing and developed countries include the following:

- **Operations Control and Management Software** - Software to perform the basic functions of network design, installation management, and maintenance control services is needed by nearly all developing countries.

Countries that need this type of software include: China, Indonesia, the Philippines, and Thailand. There are a number of considerations relative to providing software to these countries.

- In China, marketing efforts would be lengthy and complex, since efforts would need to be made to establish relationships with each of the major provinces that are currently working to upgrade their facilities. In addition, there are indications that major hardware providers such as Ericsson are providing both software and training as part of their hardware sales.
- In Indonesia, the authorities indicate that they have the software necessary to meet their current operating needs. New software is needed to better control the management process, but an extended period of time should be expected to develop a relationship for the future.
- Software services are needed by PLDT and the independent providers. However, reports indicate that software acquisitions have recently been contracted for by the national authority.
- The Telecommunications Organization of Thailand has a requirement for numerous services including software, but it has not indicated significant interest in acquiring services other than basic equipment.
- **Customer Service Systems** - These services include itemized billing systems and other services that provide customer information for analysis and alternatives assessment. Of the countries included in the survey, only China and Indonesia report that they do not currently have these types of systems.
- Users indicate that this type of information is not available in the Philippines, but PLDT indicates that this information will become available as part of their development plans.



- In Malaysia, itemized detail is available and is viewed by the national provider (STN) as a commercial product. It charges residential users M\$1.00 for a detail bill and commercial customers M\$2.00. STN indicates also that it has entered into an agreement with Northern Telecom to market its software to other countries.
- In Indonesia, the authorities indicate that itemized detail is not an important element in the development plans. They believe that it produces an excessive amount of paper that is not necessary to the service process.

Two additional types of software that INPUT believes will be of increasing importance are products to permit users to have increased control over their networks. The first is X.400 gateway software that will operate on PCs or workstations, and the second is software that will permit the control of virtual networks.

- In a number of cases, national providers indicated that with the increasing trend toward higher-speed circuits, there will be a need for users to be able to modify the allocation of their bandwidth based on changing needs and requirements. Though this software could generally be considered part of the operations control software, the level of sophistication is considerably beyond the systems that are available today in many of the countries.
- X.400 gateways are reported to be of increasing importance in all the countries and with the continuing growth of PCs in offices, the ability to integrate services will become increasingly important.

## 8. Rates and Tariff—Trends

With two exceptions, providers of domestic and international services agree that rates and tariffs will decrease over the next five years. However, the extent of the decreases varies by country. Overall, there appear to be two key reasons for tariff decreases.

- The two countries that indicated that there will not be any changes in tariffs are China and Indonesia. Both indicate that the demand for services is sufficiently great that there is no need to reduce tariffs. In addition, both countries are sufficiently underdeveloped that revenue is needed to continue development.
- Authorities in Australia indicate that rates for voice services should decline an estimated 5-10% over the next five years. They indicate that rates for circuits should decline by 10-15% over the five-year period.



- In Hong Kong, C&W indicates that there should be a trend of declining rates but believes that reductions would begin to squeeze profit margins and could result in the subsidization of some services that are being developed. C&W would not provide a specific estimate for rate reductions.
- Authorities in Malaysia indicated that rates should decline an estimated 3% to 5% per year for all services. The average was intended to reflect that some may decline at a greater rate and some may not decline at all.
- Authorities in Korea indicated there should be a reduction in rates of approximately 10% over the next five years.
- In Japan, rates for national services are projected to decline by an estimated 10% over the period. Rates for most international services are also projected to decline by approximately the same amount, with the exception of higher-speed leased circuits, which may decline by up to 20%.
- Both New Zealand and the Philippines indicate that rates should decline over the next five years by an estimated 10% to 15%.
- In Singapore, the rates for voice services are projected to decline by an estimated 20% to 30% over the period. The largest reductions are expected in packet switch services, where the rates are projected to decline by approximately 40%.
- In Thailand, rates for all services are projected to decline by an estimated 10% to 30% over the five-year period.

## E

### Regional Telecommunications Issues

#### 1. Introduction

As in other parts of the world, there are numerous issues facing both users and service providers in the Asia/Pacific area. The trend toward privatization has been embraced by some countries and is being considered by others. The rate of privatization is progressing more slowly than users would like and somewhat more rapidly than lesser-developed countries can successfully accommodate.

Among the difficulties facing a number of countries is the significantly increased number of providers that have emerged as a result of U.S. deregulation and are now trying to achieve market recognition and penetration with a wide array of products. The presence of an increased number of providers has caused a number of national authorities to suggest that they will only consider products and services that will provide a considerable degree of added value to the products provided by traditional suppliers. National authorities are interested in long-term relationships and question the long-term commitment of many providers.

The following paragraphs consider a number of issues that face both providers and users.

## 2. Organizations and Structures

Though not identified specifically by users, the organization of the national and international authorities is frequently a key cause for many of the difficulties that users experience. In an effort to build domestic organizations, a number of countries created national structures that are bureaucratic and have conflicting priorities. Countries where the structure provides a problem to domestic and international users include the following:

- China is a notable example of a country where the lack of central planning is causing significant problems by permitting the development of provincial and local services with standards that can differ from surrounding areas. In a country the size of China, users are frequently faced with dealing with numerous providers to obtain services.

The situation in China is not expected to change to a great degree; however, the government has indicated that it will begin to expand its role in the planning process to achieve a greater degree of conformity to international standards.

- In Korea, the operating authority granted to DACOM and KTA has created a confusing and difficult situation for users. With KTA having authority over most public services and DACOM having authority over public data network services, the requirement that DACOM approve requests for leased circuit services can cause extended delays.

The situation in Korea is not expected to change, particularly since the authorities have indicated that increased emphasis will be placed on the development of public data network services. The situation could even worsen, as public network emphasis grows.

- In the Philippines, the presence of multiple providers in a very limited market has created a situation where users receive less than comprehensive services from any given provider. In addition, with PLDT placing increased emphasis on development of services to outlying areas, the enhancement of services in the metropolitan areas is not expected in the next several years.
- In Thailand, the division of responsibility between CAT and TOT is beginning to be questioned by local representatives. CAT has demonstrated a responsiveness to users, and TOT has been less than aggressive in building a national infrastructure. Changes to TOT management or reporting relationships are being considered and could result in increased emphasis in the improvement of the national infrastructure.

### 3. Regional and International Regulations

CCITT Recommendations are the basis for policies and standards throughout the region. However, the degree of interpretation has begun to vary in a number of countries. Standards are expected to remain defined, but there is the beginning of a trend to interpret policy recommendations somewhat more liberally than previously.

The key change noted is the easing of regulations related to the sharing of networks. In a number of countries, requirements for sharing networks are becoming less stringent than previously. There are two reasons for the change.

- With the growth of public networks, there is less of a requirement to strictly enforce the 'closely related organization' recommendation for the sharing of networks. With public networks, there is little need for this policy.
- A number of national authorities have indicated that they will interpret the recommendations more liberally as high-speed circuits become increasingly popular. The authorities recognize the need to optimize the use of wideband circuits.

### 4. Public versus Private Network Trends

There is a definitive trend toward the use of public data networks. However, none of the national authorities indicated that any effort would be placed on trying to convert users from private to public networks. None indicated any restrictions related to the selection of a public or private network.

The trend indicated by the authorities is to continue to develop value-added services and to expand the transmission capacity of public networks, providing a viable alternative to private networks. Three general trends were noted:

- The authorities will continue to add value to their networks, inducing organizations to make use of publicly available services rather than develop their own. Initially, the services will augment the basic service provided by a private network.
- The authorities will place increased emphasis on marketing public network and value-added services and will begin to de-emphasize the availability of private network services. Users will find that they will have to become increasingly knowledgeable about leased circuit services available, to ensure that they can obtain needed services.



- Users will increasingly rely on value-added networks for many of their international services. This trend will begin during the next five years and will continue until the majority of services are obtained through value-added service networks.

## 5. Resale/Shared Use Trends

One of the key changes is the easing of regulations related to the sharing of networks. In a number of countries, requirements for sharing networks are becoming less stringent than previously. There are two reasons for the change.

- With the growth of public networks, there is less of a requirement to strictly enforce the 'closely related organization' recommendation for the sharing of networks. With public networks, there is little need for this policy.
- A number of national authorities have indicated that they will interpret the recommendations more liberally as high-speed circuits become increasingly popular. The authorities recognize the need to optimize the use of wideband circuits.

The easing of policies related to sharing networks will continue over the years, but the trend will be very gradual. Definitive change will not be noted until public networks and wideband services become more pronounced.

Restrictions on the resale of circuits will continue and could become more of an issue as competition increases and the number of value-added networks increases.

## 6. Telecommunications Standards

When asked about the extent that standards create difficulties for users, most users indicated that the standards, or lack thereof, do not create any significant difficulty. Generally, users indicate that they have found their own solutions to problems that have emerged. However, all indicate that the availability of standardized software would ease their problems and could reduce their costs.

- Users indicated the lack of network standards such as X.75, X.400, and OSI do not currently create major problems for them. However, it should be noted that, in many countries, basic services are still in such great need that Open Systems are, as yet, not an issue. Providers indicate that they will be guided by CCITT Recommendations as requirements emerge.



- The lack of application standards such as X.12 and Edifact is emerging as a problem. Application standards are increasingly needed as value-added networks increase in importance. If value-added services are to grow, application standards will need to be in place.

Differing equipment standards remain a problem, but the problem has continued to decrease over the past several years. Equipment standards are expected to become less of a problem in most countries over the next several years.

## **7. Privacy Protection/Data Flow Restrictions**

Privacy protection and data flow restrictions have not emerged as significant problems in the Asia/Pacific area and are not expected to over the next several years. Basic regulations related to privacy protection are in place in several countries, but enforcement is not known to have presented a major problem to users in the area.

No major changes are expected over the next several years. However, increased attention may emerge as the interconnection of public networks becomes more prominent to ensure that private data remains with a country.

## **8. Hong Kong Government Change—Regional Implications**

The pending changes in the government of Hong Kong should have little impact on providers or users over the next two to three years. Beyond the two to three year period, much will depend on the how the draft of the new 'Basic Law' is received.

If the law does, in fact, provide economic and political protection for the colony as has been suggested, then few changes should be expected over the five-year period. If the law does not provide the protections deemed necessary by the citizens or business, several trends may be noted.

- Businesses will begin to increase their efforts to diversify their interests out of the colony to provide economic protection, in anticipation of the change in 1997.
- There will be an increasing trend on the part of the more educated population to find ways to emigrate from the colony, worsening the labor shortage of educated middle management.

If the base of middle management resources begins to erode, a deterioration of service quality could begin.

Overall, the colony should remain stable for at least the next five years. Any trends in change should not begin to emerge to any significant degree until the end of the period.

## F

User Needs,  
Requirements, and  
Concerns

User concerns typically center around needs and requirements to implement solutions that are unique to the organization. In a number of countries around the world, the needs of the organization are viewed as having less criticality than the needs of the country.

In the Asia/Pacific area, concerns generally fall into the same categories as other countries around the world. However, indications from users suggest that many of the 'traditional' problem areas are less of a concern in the Asia/Pacific area than in other areas of the world.

In the region, the single biggest need is for increases in basic services, primarily quality telephone and leased circuit services. The need for basic services will remain a concern for a number of years.

Users generally expressed little concern over the issues of privacy protection and the flow of data beyond national boundaries. To date, users see only minimal effort to implement major restrictions. However, users note also that these issues could come into greater focus as the development of public network services becomes more pronounced.

As part of the research, users were asked to rate the level of concern over the restrictiveness of tariffs, standards, and general practices.

- Users expressed only moderate concern over the restrictiveness of tariffs. All agree that they are too high, but the tariff levels were not a major contributor to decisions about expanding or not expanding a network.
- The restrictiveness of standards was also not considered to be exceptionally high. However, a number of users noted that the primary reason would most likely be that they have greater concerns about the lack of basic services.

Users generally reflected that they were not terribly concerned about the lack of OSI or X.75 standards in countries where obtaining basic telephone services remains a problem.

- The area of concern that did receive high ratings was related to the policies of the local authorities. Users reflect concern about the lack of willingness of national providers to consider alternatives that will meet a particular need just because the approach has not been tried before.

The concerns related to tariffs, standards, and practices are expected to remain for some time.

- Tariffs are expected to continue to decline at a gradual rate, but not at a rate that would satisfy many users.
- Network standards will remain a problem as long as major international providers do not take a lead to provide greater network connectivity.
- With a few exceptions, national policies are not expected to change to any great degree.

Concerns over volume-sensitive tariffs on leased circuits do not appear to be a trend among the national providers. All indicated that this type of charge would tend to stifle the increased use of available service and would generally not be in their best interest.

Most users indicate that they have received little pressure to migrate from private to public networks; however, they believe that there will be increased focus on the use of public services.

- Users generally agreed that the approach used by the national providers to move users from public to private networks will be an indirect approach, rather than the more direct approach that has been more common in Europe.
- In addition, users believed that they would be more inclined to use public network services when the services become available.

One area for which there has been concern expressed is the availability and use of leased circuits. From all indications, this part of the service base is alive and well and will continue to be a major contributor to user services for many years.

There are a number of points that suggest that there will not be any significant reduction in leased circuit services.

- One point that suggests the continued development of leased circuit services is the implementation (or planning for implementation) of an increasing number of wideband (IBS) services.
- Most countries currently provide or are planning to be able to provide wideband digital circuits within the next two to three years.
  - With the increased use of wideband circuits, many of the authorities indicated that they will permit wider latitude in how the circuits are used.

- A number of countries indicated that they are able to provide or are planning to provide methods (software) for users to define the use of wideband circuits. In one country, this includes the ability to access a central office in the country and dynamically reconfigure a network.

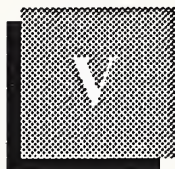
Dramatic changes in the policies or regulations should not be expected. Change will continue, but the changes will frequently only be noticeable when compared to several years ago.





## Conclusions and Recommendations





## Conclusions and Recommendations

The following sections provide a number of conclusions and recommendations related to the trends in development of telecommunications services in the Asia/Pacific region. These are followed by several recommendations for users operating in the region and providers planning to enter or expand in the region.

### A

#### Conclusions

There are a number of conclusions that can be drawn from the research conducted. They can be summarized as follows:

- Within the next five to eight years, fiber optics will be the dominant transmission medium over the major transmission routes. The majority of the currently planned new cables will become operational within the next two to three years. Additional cables are being planned and will expand available capacity in additional areas.
- The key areas of growth for the next several years will be facsimile, E-mail, and wideband circuits. EDI may begin to emerge as a key area.
  - The increasing use of facsimile will continue to drive the use of voice services.
  - E-mail will continue to grow, but will not become a dominant force until the interconnection of international networks becomes a reality. When this begins to happen, E-mail will begin to replace facsimile.
  - Wideband circuits will continue to grow and will provide users with options that have not been available previously.

The key trend related to wideband circuits is an increasing willingness on the part of national authorities to permit users greater latitude and control over the use of the circuits. Most notably, a number of authorities indicated an increased willingness to permit the sharing of circuits to a greater degree than permitted today.

- With the exception of China, Indonesia, and Thailand, the authorities indicated that tariffs will continue to decline in response to three major forces:
  - Fiber Cables - The increasing number of fiber cables and the corresponding increase in capacity will tend to create tariff reductions.
  - Competition - Even though the majority of the countries still maintain tight control over services, there is a growing trend toward competition. This is expected to continue and will cause tariffs to be increasingly competitive.
  - User Demand - Despite high tariffs and less than open policies, user demand is increasing. This is expected to create opportunities for reductions in tariffs.
- Emphasis on the use of public networks will become more pronounced. However, the emphasis will be indirect rather than direct. Primary emphasis will be directed toward providing an increased number of services that will attract users.
- National providers will increase their efforts to establish partnership arrangements. However, they will become increasingly selective.
  - Providers will want to ensure that their partner has a long-term commitment to the region.
  - Providers will be increasingly selective in the products they offer, tending toward those that will bring enhanced added value. Products that do not offer enhanced added value will be seen less favorably.
  - Providers will more favorably consider organizations that include opportunities for technology transfer as part of their negotiations.
- Users need to place greater effort in identifying future needs. The national authorities indicate willingness to place emphasis on services that users need, but suggest that they have little knowledge of specific needs.
- Users need to adopt a more proactive role in making their requirements known. Individually or collectively, they need to ensure that specific current and future requirements are conveyed to the national authorities.



**B****Recommendations—  
Vendors**

There are a number of key recommendations for vendors planning on entering the region or expanding their service base in the region.

- International providers need to identify the primary needs of users. To understand the needs, effort will need to be placed on contacting both the headquarters and local/regional office, since the perceptions of need vary. National providers indicated that they are increasingly in need of information about key user needs and requirements.
- International providers need to ensure that the products being offered have 'enhanced' added value. National providers indicate that they are generally satisfied with the basic value added services and are looking for the 'next generation' of products and services.
- International providers should develop plans recognizing that marketing cycles can be lengthy. National providers have become less satisfied with organizations that are here today and gone tomorrow. They are looking for the development of long-term relationships that can meet needs over time.
- The ability to transfer technology is becoming increasingly important. Discussion should include commitments to work to develop local staff to assume responsibility for the product or service.
- International providers should promote full-service capability. Although the national provider may not want or need the breadth of services offered, the ability to meet a range of needs is extremely important.

**C****Recommendations—  
Users**

Recommendations for users center on three primary areas:

- Users should make increased efforts to make their requirements known.
  - Users need to identify specific current and future requirements. Sharing of trends in long-range plans assists national providers in understanding basic requirements that will emerge.
  - Plans need to be quantified to the extent possible. National providers need to understand the potential impact of growth of the company and of the plans.
  - Users need to increase their lobbying efforts to obtain needed resources and services.

- Users need to place increased effort to build relationships. Users should make the investment to identify problems and successes.
- Users should begin to plan for a service environment. Although private networks will dominate for the next several years, the interconnection of international networks will drive national authorities to focus increasingly on the use of public network services.

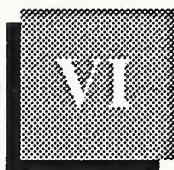


## Country Profiles









## Country Profiles

### A

#### Australia

##### 1. Introduction

Dating from its founding in 1788, Australia has, until recently, remained somewhat isolationist in its economic policies. However, the situation has been changing rapidly in the past few years. This is particularly true in the area of telecommunications.

##### 2. Economic and Political Setting

With the return of the Labour Party to power in recent elections and the effective elimination of the party archrival, there were high expectations for rapid progress toward economic stabilization and development. However, dissatisfaction has loomed due to the government's apparent inability to quickly address Australia's economic problems.

During the 1986-1987 fiscal year, with the abandonment of the fully indexed wages, wages grew approximately 6% while consumer prices rose approximately 9%, resulting in the first decline in household incomes in 30 years.

However, during the same period, the country saw an increase in the volume of tradeable goods, tourism increased significantly, and the banking and finance sector saw the beginning of consolidation. In addition, with the recent revaluing of the Australian dollar, foreign companies have continued to make investments in a number of basic industries, particularly automobiles and mining.

Though the near-term economic picture is unclear, the government's focus on privatization and liberalization of the economic infrastructure is seen by many as strong indication that the economy will rebound and develop with a more solid economic base.

One area where privatization has been particularly noted is in the area of telecommunications, where a number of changes have taken place.

### **3. Telecommunications Services and Plans**

#### **a. Telecommunications Organizations**

Governed by the Australian Telecommunications Commission, primary telecommunications services have, until recently, been the responsibility of Telecoms and the Overseas Telecommunications Commission (OTC).

Within the overall structure, Telecoms has overall authority for the provision of all services within Australia, including the approval and certification of all equipment.

OTC, operating under the authority of a charter granted in 1946 (the Overseas Telecommunications Act), has responsibility for providing international telecommunications services. This overall structure has remained for a number of years; however, as a result of a comprehensive study of the industry completed in 1986 (the Green Paper) a number of changes are being seen (Exhibit VI-1).

EXHIBIT VI-1

### **AUSTRALIA TELECOMMUNICATIONS ORGANIZATIONS KEY CHANGES**

Increased Quality Emphasis

Profitability Focus

New Service Providers

Increased International Competition

Increased Customer Responsiveness

- Increasing emphasis is being placed on service quality and profitability. One of the recommendations of the Green Paper was that both the organizations place greater emphasis on profitability and asset utilization.

Included in the emphasis on profitability has been a reworking of accounting systems to ensure that services are not cross-subsidized. In the future, there will be increased emphasis on service profitability.

- New, specialized providers are beginning to emerge. AUSSAT has been established as an independent organization to provide satellite-based services within Australia. AUSSAT is independent of Telecom.
- Plans are currently underway to establish an independent equipment and policy review and approval body similar to OFTEL in the U.K. This will effectively remove some of the control that Telecoms has had over the equipment certification process.
- OTC has established an independent consultancy group to compete for international telecommunications contracts. This places them in direct competition with major providers from throughout the world. To date, they have been aggressive in competing for major construction and service contracts in areas of Asia.
- Major efforts are underway by OTC to increase its responsiveness to customer requirements. OTC has recently set up a national account marketing structure that will ensure that senior OTC representatives are directly in touch with major customers.

Overall, there is a definitive trend toward greater responsiveness to customer need and increased focus on providing services that are most needed by the customer.

#### **b. Voice Services**

Quality telephone services are a key element to the development of both domestic and international services.

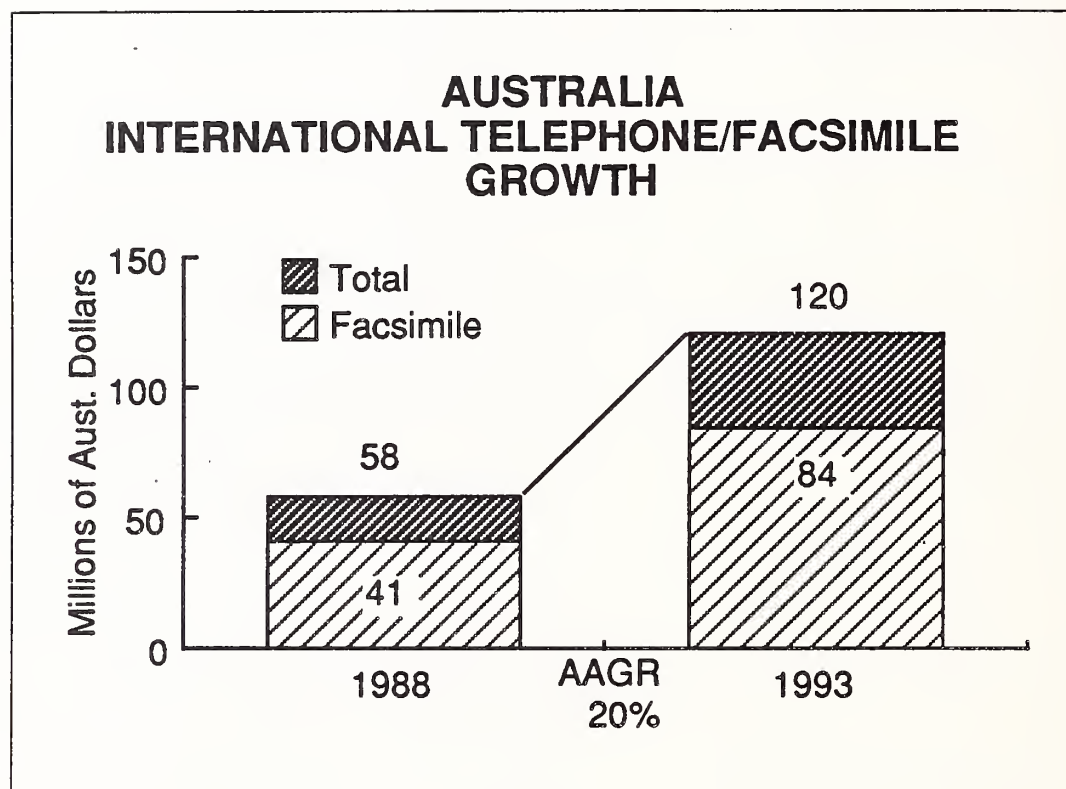
Telephone service revenue accounts for the majority of revenues of both Telecoms and OTC. For OTC, telephone service accounts for more than 85% of all revenues.

Telephone services, particularly international, have been growing rapidly over the past several years. From 1982 through 1987, telephone services have grown at an average rate of approximately 20% per year.



Of the growth of international telephone-based services, facsimile has accounted for an increasing proportion of the total traffic. In 1987, facsimile accounted for an estimated 70% of the total international traffic (Exhibit VI-2). This trend is expected to continue for the next several years and may be somewhat greater than projected as Group 4 facsimile units are introduced and the overall quality of international PSTN improves.

EXHIBIT VI-2



With the improvements in quality and increased use of telephone-based services, both users and providers believe that there will be a general decline in the international tariffs.

Overall, users and providers agree that the tariffs for telephone-based services should decline at a rate of approximately 5% to 10% per year. Users generally indicate that 5% is a more realistic figure.

Whether the tariffs do, in fact, decline and to what extent they decline will depend on a number of factors (Exhibit VI-3).

- OTC and telecoms will be able to consider reducing tariffs if they can continue to improve their profitability picture.

There are a number of indications that the unions, which traditionally have had a strong hold on all organizations, have begun to lose some of their power and are being more cooperative with management in a number of industries.



## EXHIBIT VI-3

**AUSTRALIA  
TELEPHONE TARIFF REDUCTION  
REASONS****Improved Profitability****Increased Facsimile Use****Fiber Optic Cables**

- The continued introduction of improved facsimile devices is expected to continue to drive increased use of domestic and international telephone-based services.
- Both Telecom and OTC agree that the continued introduction of higher capacity (fiber) cables should have the effect of driving tariffs down

Unlike a number of countries in the Asia/Pacific area, authorities in Australia indicate that growth of the cellular telephone industry is low on their list of priorities.

Although they consider cellular service important, and it has been growing at a rate estimated to be approximately 15% per year, there is little work being directed at promoting the service.

One of the reasons given for minimizing the importance is that, in order to provide a truly effective service, it would have to be national in scope and, given the sparse population in the majority of the country, service provision would not be cost-effective.

It should be noted that users disagree with the premise and indicate that the real reason for not actively promoting the service is that the authorities would find it difficult to control the volume and type of data being transmitted.

Whether it is promoted or not, projections are that cellular service will grow at a rate of at least 15% percent per year for the next four to five years.

### c. Text Services

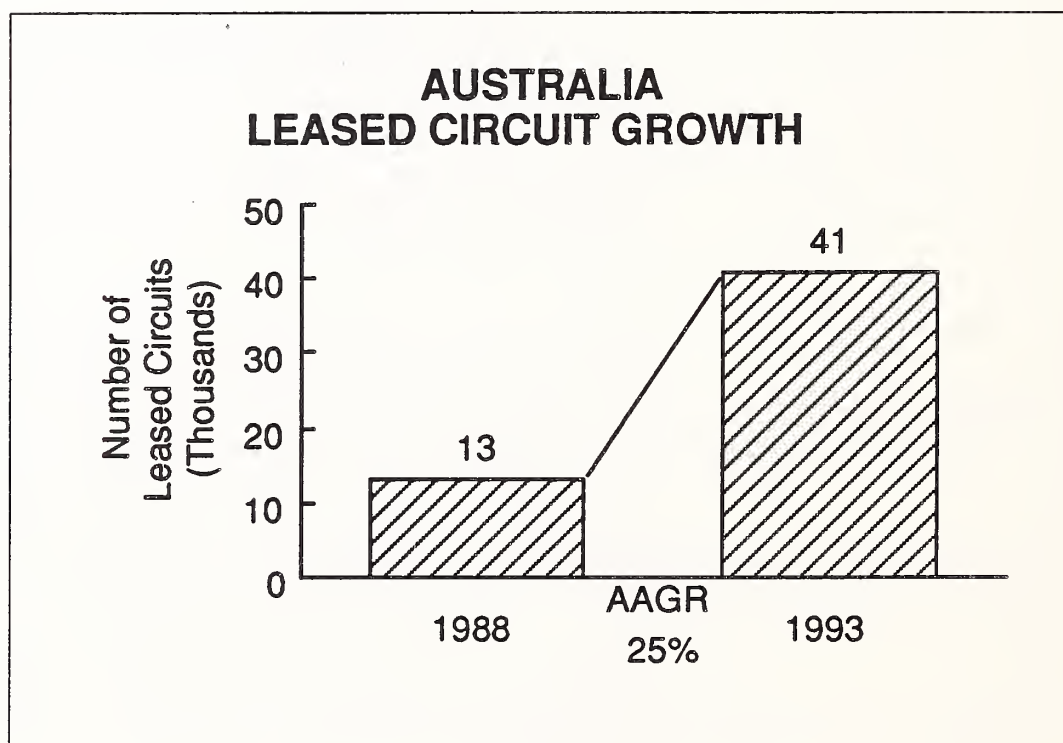
As in most countries, the rate of growth of telex services is declining, although they still represent the second largest source of revenue for international services. This trend is expected to continue and become more pronounced as the demand for facsimile and E-mail services grows.

Both Telecoms and OTC indicate that they are not placing a great deal of emphasis on the marketing of domestic or international telex services. OTC indicates that telex services have recently been identified as one of the areas that will be increasingly viewed for overall cost effectiveness.

### d. Leased Circuit Services

The demand for both domestic and international leased circuit services is continuing to grow. The current estimate is that the number of leased circuits will grow from an estimated 13,000 in 1988 to more than 40,000 by 1993, an average annual growth rate of approximately 25% (Exhibit VI-4).

EXHIBIT VI-4



However, as in most countries in the Asia/Pacific area, there is a trend toward fewer high-capacity circuits. For international services, there is a trend toward IBS-type services between Australia and other regional hubs (Europe, U.S., etc.).

Driving the shift to higher capacity circuits is the need for greater functionality in circuit use. Two key forces are likely to be at the forefront of the use of larger capacity circuits.

- The first is the ability to perform dynamic network allocation—using software to vary the structure of a network throughout a work period.

Both OTC and Telecom indicate that they support the concept of software defined networks and the ability of a user to modify network structure without intervention of the provider.

- The other is the implementation of X.400. Introduction of X.400 is expected to be introduced on a pilot basis in 1988, giving users the opportunity to achieve greater functionality of their networks.

Overall, network services are an important part of the overall service offerings of both Telecom and OTC.

- For international users, OTC appears to be becoming more flexible in the 'shared use' of international circuits.

Unlike several years ago when the question of the sharing of international circuits would have elicited a flat 'no', it now indicates that shared use could be permitted, on a case by case basis, among corporate entities that are 'reasonably' associated.

- With increased focus on service, OTC considers high quality network management to be a service that they should be able to provide. They admit that they have not done as good a job as possible in the past and look to providing a higher quality range of services.

With OTC's increased emphasis on international consultancy-type services, their entry into the arena of international 'managed networks' might well be expected at such time as the concept begins to grow.

Overall, the cost of international leased circuits are expected to decline over the next several years.

While there is a degree of disagreement between users and the providers, the overall reduction is expected to be (on average) in the range of 7.5% per year. There is general agreement that the majority of the decreases will occur in the area of international leased circuits. The reductions will be driven by two key factors.

- There will be increased demand for leased circuit services.
- Implementation of higher capacity fiber cables will increase capacity and drive prices down.

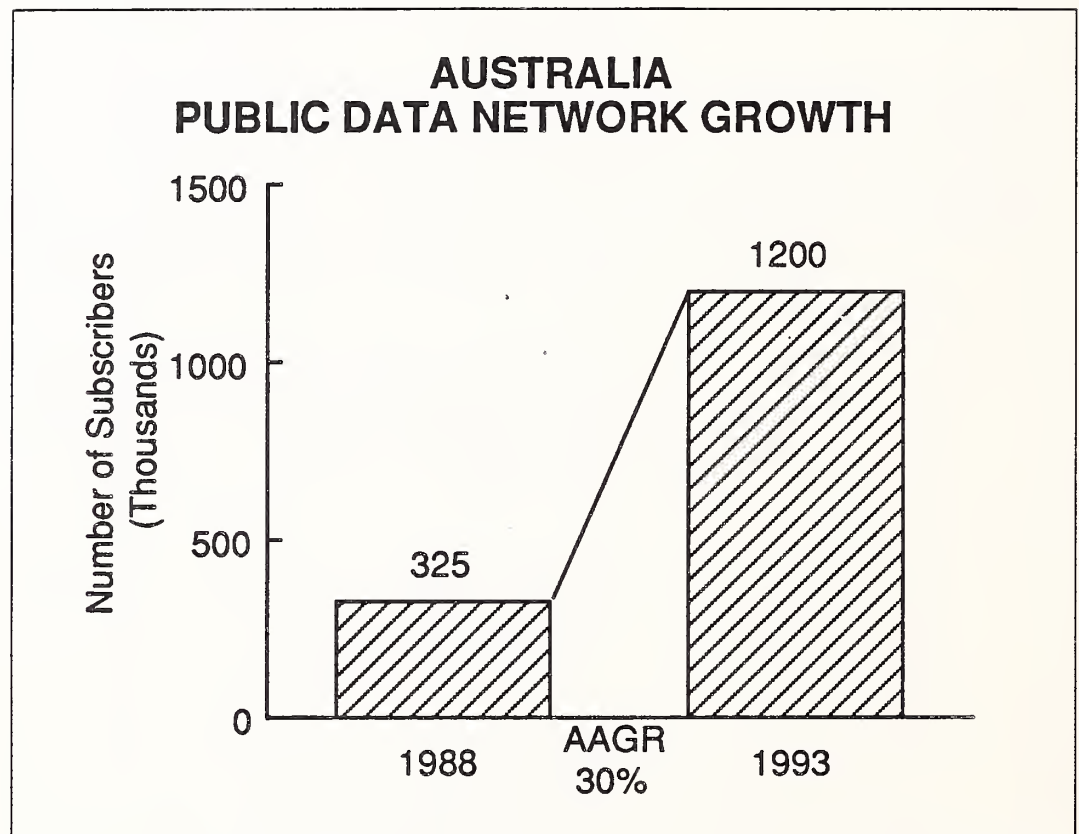


### e. Public Data/Value-Added Network Services

Public data network services are a high priority to both Telecoms and OTC. Following initial difficulties with the domestic network (AUST-PAC), use and volumes have begun to grow and growth is expected to continue.

With the joint development of a domestic/international E-mail service between Telecom and OTC, there were an estimated 250,000 users of public data network services at the end of 1987. The growth rate is estimated to be approximately 30% per year (Exhibit VI-5).

EXHIBIT VI-5



There are a number of driving forces behind the increase in the use of public data networks (Exhibit VI-6).

- OTC is introducing a discount pricing schedule for use of international public data networks. Similar to discount periods for international telephone calls, OTC will introduce reduced tariffs for network use during 'off hours'.
- With the introduction of higher capacity connections, users will be encouraged to use public data connections as 'backups' to international leased circuit services. This will be introduced in conjunction with the ability for a user to 'virtually define' the size and structure of the network during the use period.



## EXHIBIT VI-6

**AUSTRALIA  
PUBLIC DATA NETWORK GROWTH  
REASONS**

Discount Pricing Schedule

Leased Circuit Alternative

Increased Value-Added Services

- E-Mail
- Telex-to-Facsimile
- Facsimile Store-and-Forward

- Both Telecom and OTC are expected to place increased focus on value-added services such as E-mail and EDI.
- Plans are currently underway to introduce additional value-added services such store-and-forward facsimile and telex-to-facsimile conversion. These are going to be made available with the introduction of the X.400-based Message Handling Service.

**f. ISDN Services**

While both Telecom and OTC look to provide ISDN-based services, neither is currently able to identify a specific service that is in great demand.

Within Australia, the ability to provide Basic Rate services is expected within the next year. The ability to provide 'Primary Rate' services is expected within a three to five year time period.

For the long term, Telecom and OTC look to the introduction of 'service sets' that would generally fall under the umbrella of ISDN and to the user community to identify exactly what the services should be. At the present time, users have not identified any major categories of service.

#### 4. National Telecommunications Issues

Key issues center around the ability of both Telecoms and OTC to continue their policies of developing greater functionality and placing increased emphasis on user needs.

User experience indicates that services have traditionally been guided by the needs of local unions rather than the needs of business. This appears to be changing, but is not expected to change quickly.

One new area of service indicates that there will be increased focus on the opening of markets and a greater degree of user focus.

- OTC recently introduced an international database service providing information about telex, teletex and facsimile directory information. Incorporating a number of related services, this service has processed more than 125,000 multiple inquiry calls and is being promoted internationally.

#### 5. User Needs and Requirements

In Australia, user needs and requirements generally center around the continued reduction of restrictive policies. Telecoms is noted for restrictive policies, particularly where the use of equipment is concerned.

Recent changes to establish an independent organization to review equipment and issue equipment certifications is expected to provide some easing of the policies, since the process will be out of the hands of Telecoms.

In addition to restrictive equipment policies, two-tier tariff policies for access to international public network services are considered to be punitive by most users. This policy is not expected to change, since both Telecom and OTC have indicated that they have an interest in promoting the use of the domestic network.

**B****People's Republic of  
China****1. Introduction**

Faced with the need to make wide-ranging investments to be able to be in a leadership position in the 21st century, the People's Republic of China (PRC) has made a significant commitment to the development of its industrial infrastructure and to the development of its telecommunications capability and industry.

Though many of the results are not readily apparent, numerous changes have been made and are expected to continue for the next several years.

**2. Economic and Political Setting**

Working to enter the 21st century, the PRC has exhibited many of the symptoms of a society caught between ideologies. Through the country is dedicated to the Communist philosophy, many have had an opportunity to taste the fruits of Capitalist economic policies.

Recognizing the need for economic reform, the government has made significant strides in attempting to blend western economic capitalism with Communist sociology. Much has been at the behest of younger members of the ruling party.

However, dramatic shifts away from Communist principles should not be expected. At the 13th Party Congress, the acting party secretary indicated that while certain party principals could be put on hold for a period of time, four basic principals would remain.

- Abide by the peoples democratic dictatorship
- Follow the socialist road
- Uphold Marxism-Leninism
- Uphold Mao Zedong thought

Recognizing the needs of the 'reformists' and the need to ensure control over the process of economic reform, Zhao indicated that, with the economic reforms, China is now in the primary stage of socialism, indicating further that China is "embarked on a process of modernization that took place under capitalism in most countries."

With the entry of younger leadership into the central governing body, there are indications that the government will continue with the modernization process—albeit at a slower pace—of separating the party from the government and separating ownership from management.



The changes in government focus should have a positive effect on national development, but it could be years before concrete results will be shown.

The changes have not been without their economic impact. Following a slowdown in 1986 the economy picked up in 1987 with continued high growth in capital construction, wages, consumption funds, and money supply. However, industrial output and labor productivity lagged and inflation reached 10% in certain areas.

Figures indicated that in mid-1987 there were more than 163,000 investment projects underway. Recognizing the problems associated with excessively high short-term investment, the government, in mid-1988 mandated a cutback in construction development projects that did not make use of Chinese supplies and labor.

As an indication of difficulties facing the government planning bodies, for the period 1981-1985, the nation's total wage bill increased by approximately 50%, compared to an increase of approximately 33% in productivity. In 1986, wages of government staff increased 20% when national income increased by approximately 7% and productivity increased by only 4%.

Suffering from the economic woes of rapid expansion, there are concerns over how the national accounts can be balanced in the foreseeable future.

Though the government is not believed to be faced with imminent crisis, a more moderate and well-thought-out (planned) approach to national development is anticipated by some, with greater focus on the longer term.

### **3. Telecommunications Services and Plans**

#### **a. Telecommunications Organizations**

Though they are loosely governed by the country's Ministry of Posts and Telecommunications, the People's Republic of China (PRC) has no single provider or real authority for national and international telecommunications services.

The Ministry usually exercises authority over long-distance trunk and international services, and local network services are planned and controlled by provincial and local authorities.



Each provincial capital has an administrator of Posts and Telecommunications, and the province is generally autonomous to the area. Local authorities are responsible to the provincial capital; however, many of the local authorities determine not only their own requirements, but some of the standards that they will use.

In addition to the somewhat loose structure, there are a number of public and private organizations that provide telecommunications services.

- The Huaying Nanhai Oil Telecommunications Co.—40% owned by C&W (H.K.)—provides voice and telex service to offshore oil and gas companies.
- Most of the ministries and a number of the provincial governments have established their own networks. Some have developed their own standards.

As a result of the loose structure, there is little central planning or coordination of planning efforts.

In addition to the provisioning of telecommunications services, a number of organizations operating under the guidance of the Posts and Telecommunications Industry Corporation (PTIC) are engaged in the production of telecommunications products for both the domestic and international markets. More than 25 different factories produce a wide variety of products (Exhibit VI-7).

The lack of central authority is having a significant impact on both users and providers. For providers, the necessity exists to deal with numerous local, regional and national authorities, making unified planning difficult and sales costs exceptionally high.

For users the fragmented structure has meant that services that could be available are not, and the coordination of services is difficult. Users are also frequently faced with the need to deal with a variety of groups. Because of the difficulties, many users have opted to let C&W (H.K.) be the primary interface for the ordering, implementation and management of services.

## EXHIBIT VI-7

**CHINA  
KEY TELECOMMUNICATION PRODUCTS****Fiber and Coax Cable****Copper Cable****PABX Equipment****Microwave Equipment****Multiplexers****Analog Carrier Equipment****Analog/Digital Testing Equipment****Power Supplies****b. Voice Services**

As reported by users, telephone service generally falls into two categories—very good or poor.

In a country that is reported to have telephone density of 1.8 per thousand, domestic telephone service is reported to be poor. The density is estimated to be 4 per thousand for major metropolitan areas.

While significant amounts of work are underway, the government has not yet set universal telephone service as a national goal. As of the end of 1985, there were an estimated 150,000 telephones in the capital of Beijing. While this number is growing rapidly, the lack of service in other areas severely hinders national service.

International service from the major cities of Beijing, Shanghai, and Guangzhou are reported to be quite good. Frequent users of international service indicate that the overall quality can frequently be rated a '4' (very good) on a scale of 1 to 5.

Currently, high-quality direct international dialing is possible from Beijing and Shanghai to more than 43 countries. Direct international dialing is reported to be available from other inland and coastal cities to more than 16 countries in Asia, Europe, and North America.

With the increased emphasis on the implementation of fiber cables and digital switches in the major metropolitan areas, users generally expect the quality of service to continue to improve; however most acknowledge that service between these areas and other areas of the country will be less than adequate for a number of years to come.

One of the bright spots in the development of telephone services has been the implementation of cellular services. Currently, there are cellular mobile systems in Beijing and the Pearl River area of Guangdong.

As in many countries with underdeveloped infrastructures, the growth of cellular services has been rapid and is expected to continue.

One of the key areas of development of cellular services has been in the Pearl River area where the Guangdong PT has developed an extensive cellular system in conjunction with C&W (H.K.).

The system has been implemented to permit access from either Pearl River or Hong Kong, essentially bypassing the switched network structure.

### **c. Text Services**

Unlike more developed countries, telex is a mainstay for text transmission in the PRC and has continued to grow. Between 1985 and 1986, the overall volume of telex traffic increased by an estimated 65%, and international telex traffic is reported to have increased by nearly 40%.

Overall, telex is expected to continue as a mainstay for text transmission, and traffic is expected to continue to grow for some time. Like Japan, China has difficulty with the computerization of their ideographic script and has placed significant emphasis on the development of sophisticated phonemic systems and dot-matrix displays and printers.

### **d. Leased Circuit Services**

Leased circuit services that are installed are reported to be generally good quality—when they work. The major problems with leased circuit services are the lack of higher speed services and repairs that can take extended periods of time.



Within the PRC, the majority of data transmission takes place over leased circuits; however, 2400bps is the highest speed that is generally available. Users report success at short interval transmissions at 4800bps, and several have indicated that 9600bps is achievable, in some cases, from the major metropolitan areas. Outside the major metropolitan areas, 110bps is generally the maximum available.

Key problems are associated with circuit repair when an outage occurs. Users report that repair can take extended periods of time (days to weeks) due to the coordination that must take place between the various local and regional providers.

Generally, users indicate that leased circuit services should not be extensively considered unless they are in the major areas of Beijing, Shanghai, or Guangzhou. However, the situation is changing rapidly.

While there are a number of projects underway to upgrade the national network, one of the key indicators of the level of development is a recent contract with Alcatel to implement 34Mbps and 140Mbps digital fiber cables in the Beijing area and to install a 2200km fiber link between five provinces.

#### **e. Public Data/Value-Added Network Services**

There is currently no national public data network in the PRC. However, the Ministry has contracted with Alcatel for development of a network that will initially have three nodes.

While implementation of the network has been delayed to consider international implications of the network, implementation is now planned for 1990. Access from this network to international network services is expected to be through a node in Paris.

In addition to the development of a domestic packet network, both Telenet and Tymnet report that service is available through nodes in Beijing. Users indicate that, to date, the service has been less than satisfactory due, primarily, the quality of the dial connections.

There is currently a limited electronic mail service available from Beijing. The Ministry offers Dialcom's E-mail service in conjunction with C&W (H.K.) and is planning on making E-mail one of the services available when a public data network is implemented.

#### **f. ISDN Services**

As in many countries, ISDN is part of the national planning process, but any implementation of ISDN services is expected to be at least five years away. Users indicate that the five-year period would more likely be eight to nine years.



### **g. Other Services**

There are numerous projects currently underway to modernize national and local facilities and services. Among the projects are the following.

- A \$5.4 million contract has been awarded for the expansion of cellular mobile telephone services in Shanghai.
- NTT (Japan) has announced that it will give the Ministry telephone crossbar equipment to be used in approximately 20 rural telephone facilities. The equipment will permit an expansion of the number of terminals by some 350,000.
- The government will begin the first national satellite news broadcasting system, making the distribution of news to some 400 news agencies 15 times faster than before.
- The Shanghai telephone company, in conjunction with Alcatel, is installing an additional 60,000 lines using System 12 digital exchanges.
- A contract has been let to supply 1.2 million kilometers of all-plastic-coated cables and 6,600 kilometers of optical waveguide cable in Beijing.
- Alcatel will supply an estimated ten of its E10 digital exchanges and 12 satellite exchanges in Beijing, adding 155,000 exchange lines. The number of digital exchanges will be increased from 14 to 24.
- In the Guangzhou and Shenzhen areas, Ericsson will provide 210,000 local and 4,900 long distance lines.
- Philips has received a license for two factories to make private digital exchanges in the PRC.
- The PRC has begun computer communications with West Germany, representing the first international computer communications link.
- A 480-circuit digital microwave project in the Guangdong Province will increase international direct dialing capability by over 300%.
- Fiber optic cable is currently being added to the local loops in 23 cities.

### **4. National Telecommunications Issues**

Development of a national telecommunications infrastructure is a high priority of the government. The five-year plan which covers the five-year period of 1986-1990, allocates an estimated U.S. \$21.5 billion. Key objectives of the plan include:

- Double the number of telephone sets to a total of 12.5 million by 1990.
- Triple the number of telephone lines to 10 million by 1990.
- Expand the deployment of digital switches, providing a digital switching capability in all major metropolitan areas.
- Expand the use of fiber and microwave technology
- Create mobile (cellular) networks in major metropolitan areas

One of the key issues facing the government is the coordination of development activities. The Ministry is reported to be plagued with bureaucracy and inefficiency; effort is needed to bring coordination between the national and regional/local planning authorities.

When considering new products or services, the Ministry has placed emphasis on the development of external relationships to assist in the development of products and services. The relationships have been predominantly with European firms for two key reasons.

- European firms have demonstrated that their technology is proven and reliable.
- European firms have demonstrated that they plan on continuing their relationships for the long term. They have established relationships of trust that are perceived to be enduring.

## **5. User Needs and Requirements**

Users acknowledge the difficulties that the PRC has in developing a technological base and, while they feel frustrated, are generally accepting in many of the difficulties in dealing with the bureaucracy. In general, their key requirements center in three areas.

- The processes for obtaining services needs to be streamlined.
- Increased focus needs to be placed on the repair of faulty services. Users indicate that they frequently can contend with the failures if services could be restored more quickly.
- An increase in the availability and speed of leased circuits is a universal requirement. Users need more, higher speed circuits between Hong Kong and the major business areas.

## C

## Hong Kong

**1. Introduction**

Long a bastion of entrepreneurial spirit and free-wheeling finance, and with one of the best telecommunications environments in the Asia/Pacific area, Hong Kong continues to be the choice for many companies for telecommunications network hubs and development activities.

Although this is not expected to change dramatically in the next few years, a number of activities could cause this to change—for better or worse.

**2. Economic and Political Setting**

Dominating the political environment is the return of Hong Kong to the rule of the People's Republic of China (PRC) in 1997 and the impending promulgation of the 'Basic Law' that will govern the area following the change in 1997.

Following initial reactions to the change, businesses have generally adopted a wait-and-see attitude, biding their time until the Basic Law is finalized. However, a number of businesses involved in capital construction have begun to adopt financing schemes geared to payout and long-term return that will ensure maximum return prior to the year 2000.

While the pending changes seem to be having limited impact on the business community, Hong Kong citizens are generally nervous about the pending changes. This is particularly true for individuals whose families have 'escaped' from the PRC. Many have expressed concern about the personal impact and attempts are being made to identify opportunities to emigrate. There are some resultant concerns over the possibility of a 'brain drain'.

Economically, there has been little change, following the initially reported flight of capital. Some economists saw 1987 as the beginning of a potentially bad period. However, the 'black cloud' generally failed to materialize.

Projected to have a GDP growth of approximately 8.7% for 1988, the figure was increased to 11% when consumer demand jumped and exports continued to grow. During 1987, the growth of domestic exports was more than 23%. The continued growth was attributed to several reasons.

- Further decline of the U.S. dollar
- Continued growth on the international financial community



- Increased access to cheap labor across the border in the PRC (Hong Kong has only a 1% unemployment rate).
- Continued increase in domestic demand, fostered by an estimated 25% investment in plants and machinery.

Overall, the political environment and economy of Hong Kong are not expected to change dramatically over the next two to three years.

Until the Basic Law is promulgated, few companies are expected to make significant changes, and growth of the region, coupled with the business environment in Hong Kong, will continue to attract companies that are interested in conducting business in the region and/or in the PRC.

### **3. Telecommunications Services and Plans**

#### **a. Telecommunications Organizations**

With a history traceable to 1871, Cable and Wireless (H.K.) has long been the dominant provider of international and more recently, through Hong Kong Telephone, domestic telecommunications services.

A provider of high quality services and the preferred representative for services in the Asia/Pacific area by many users, C&W (H.K.) is being challenged by an environment that is changing and by competitors in an area that has traditionally been closed to competition.

Among the many changes that are taking place in Hong Kong, significant restructuring has been taking place within the telecommunications industry.

Since 1981, when Cable & Wireless PLC decided to divest itself of portions of its investment in Cable & Wireless (H.K.), there has been an ongoing restructuring of the telecommunications industry in Hong Kong.

The most recent change has been the public sale of shares by the Hong Kong government in Hong Kong Telecommunications, a company set up by the merging of the interests of Cable & Wireless PLC, Hong Kong Telephone (domestic provider), and Cable & Wireless (H.K.), the international provider.

Exhibits VI-8 and VI-9 provide a summary of the overall organization of the key players in the Hong Kong telecommunications market. Exhibit VI-8 identifies the structure before the recent sale by the government of a portion of its shares in the newly created Hong Kong Telecommunications. Exhibit VI-9 provides a picture of the structure following the recent sale.



EXHIBIT VI-8

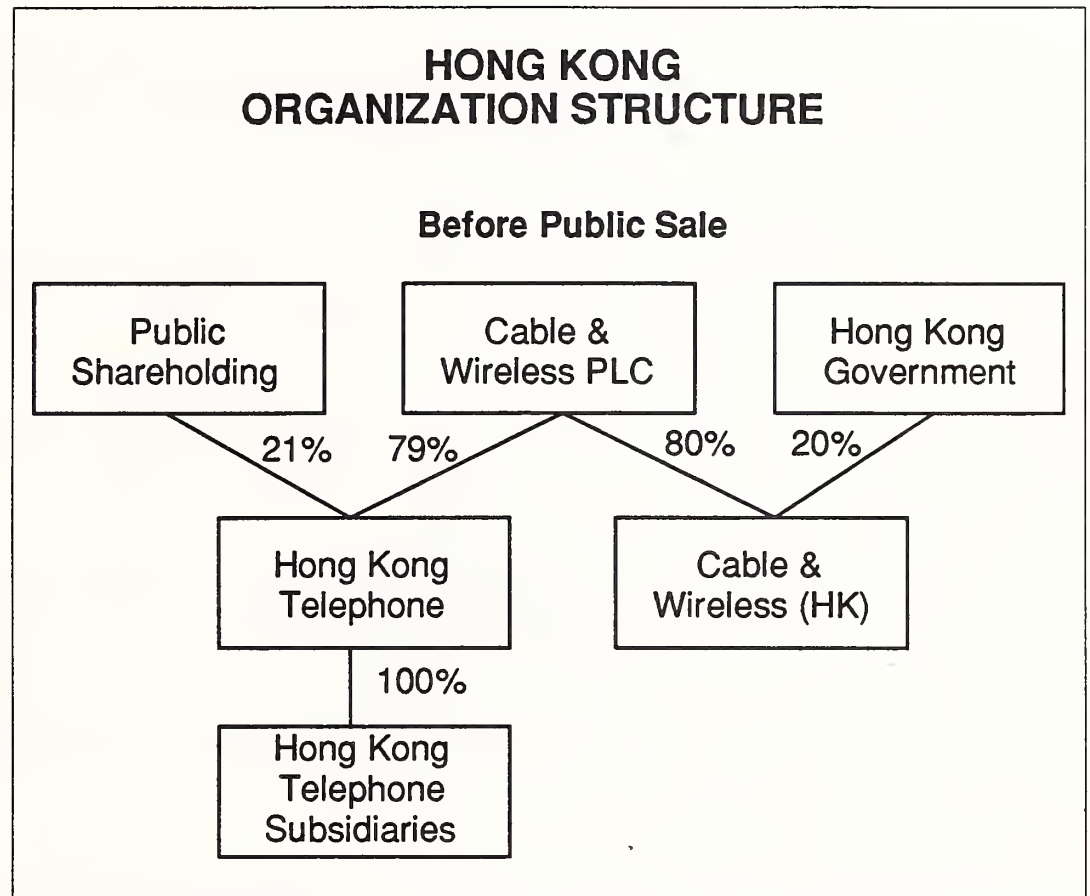
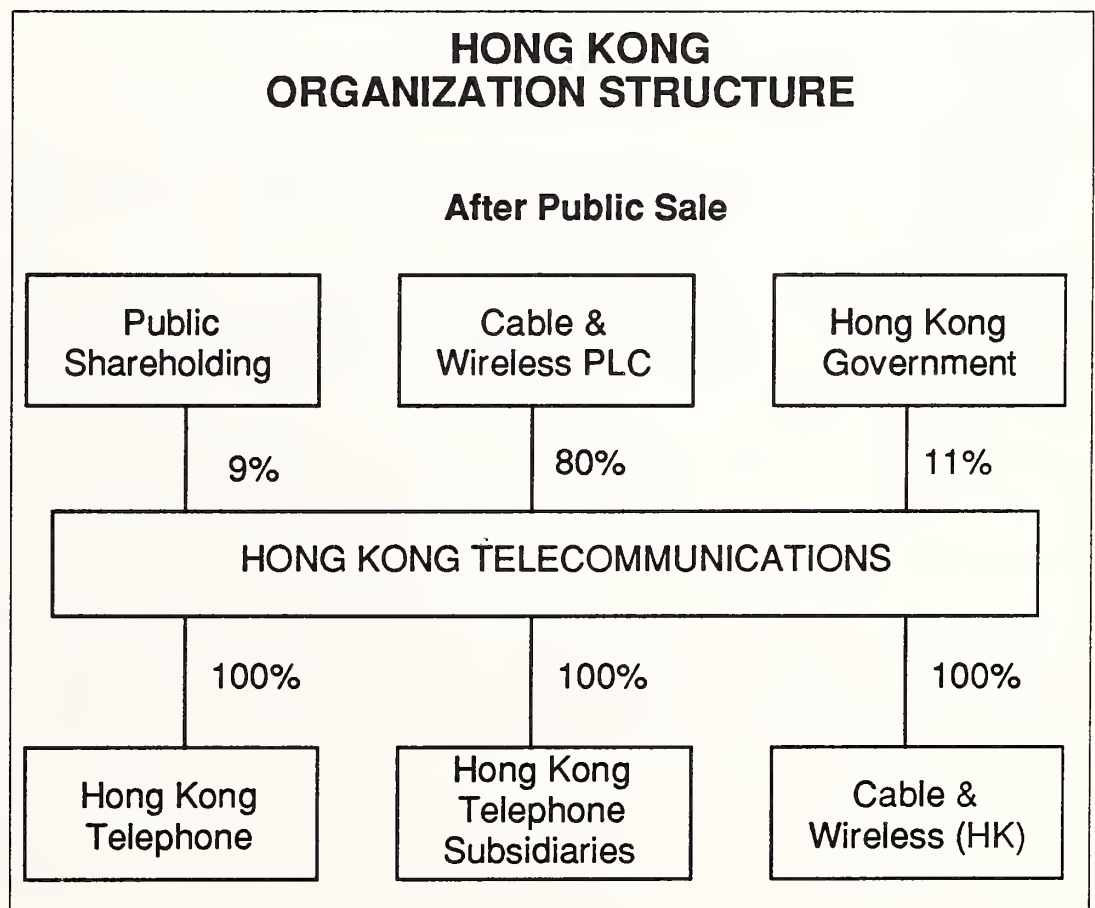


EXHIBIT VI-9



Following the merger of interests, both Hong Kong Telephone and Cable & Wireless will continue to operate independently. However, the merging of financial interests indicates a mutuality of interest in the development of the industry.

While C&W (H.K.) has been granted an exclusive license to provide international telecommunication services through the year 2006, the lack of exclusivity in providing domestic services has fostered the entry of a potentially major competitor.

Hutchison Communications, a subsidiary of the Hutchison-Whampoa Group, ranked the fifth-largest company in 1986, has emerged as the leading provider of paging and cellular services in the Colony.

In conjunction with British Telecom International, Hutchison Communications is positioning itself to be a key competitor to the newly structured Hong Kong Telecom.

A key indication of Hutchison's plans is their recent bid made to the government to build a second telecommunications network in the Colony.

While little is expected to change in the near term, there are indications that the key players are aligning themselves to ensure continued success following the government change.

#### **b. Voice Services**

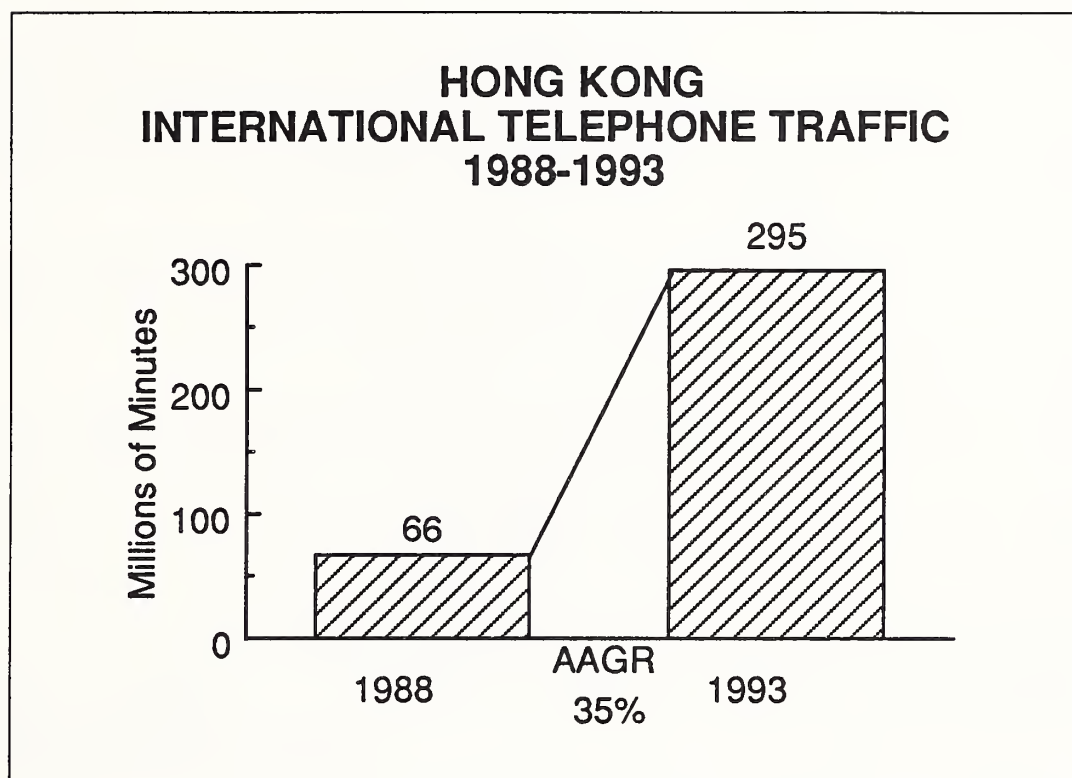
As it is in most countries in the Asia/Pacific area, telephone service is a significant source of revenue for the local providers.

Rated by most user as generally high quality, telephone-based services can be expected to continue to grow. Between 1986 and 1987, the volume of international telephone service grew by an estimated 53% and the volume of calls to the PRC grew by an estimated 65%.

While a portion of the growth can undoubtedly be attributable to new business, users indicate that their use of facsimile is expected to grow at a rate of 25% to 30% per year for the next several years.

A conservative projection of the growth of international traffic indicates that with increasing business growth and the continuing focus on the use of facsimile, international traffic from Hong Kong will continue to grow. (Exhibit VI-10).

## EXHIBIT VI-10



In addition to general business growth and the increased use of facsimile, the introduction of FreeFone service into Hong Kong could further stimulate demand for telephone-based services.

#### c. Text Services

While the use of telex is continuing to grow, the rate of growth is beginning to slow as users shift from the use of telex to the use of facsimile.

Overall, the rate of growth for telex has held steady for the past few years at approximately 15% per year. However, the rate of growth of international telex has slowed to approximately 7% per year.

Considering the generally rate of business growth and the projected growth for facsimile, the growth of telex is minimal. This trend is expected to continue.

#### d. Leased Circuit Services

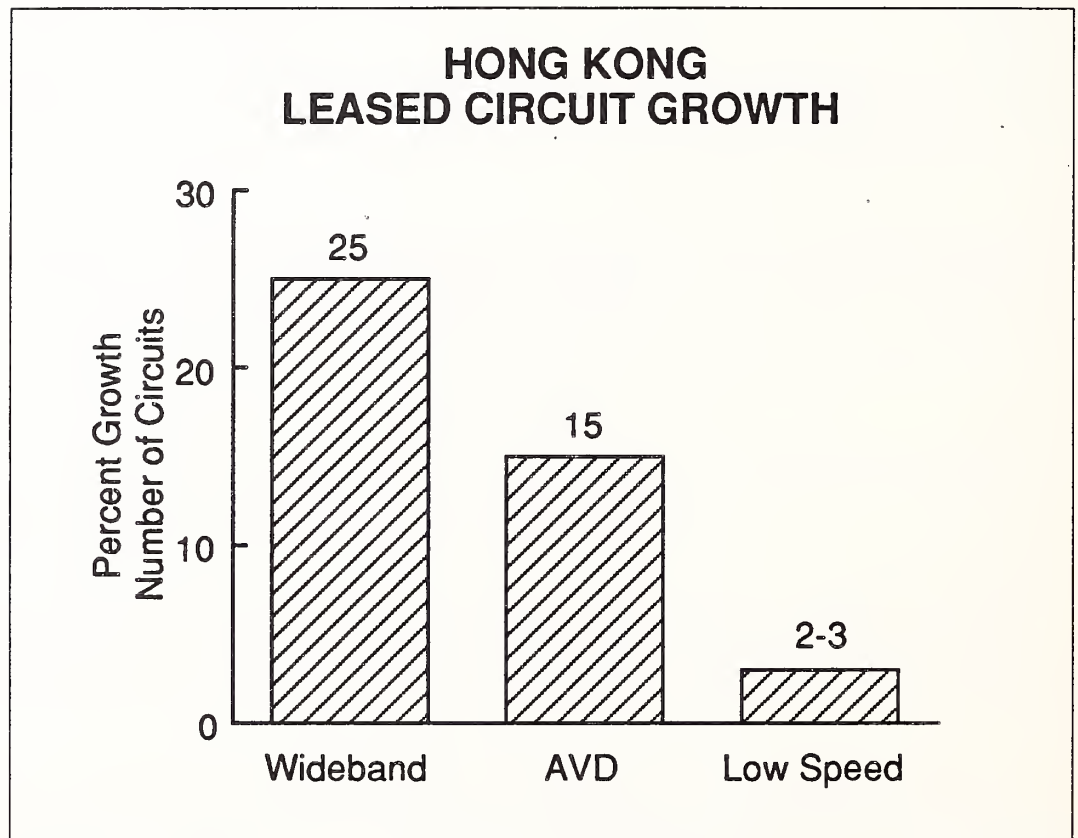
Leased circuit services continue to be a significant focus of the services provided by C&W; however, the composition of services types have changed considerably over the past several years. The trend is expected to continue.

Two key trends in the use of leased circuits is noted over the past four to five years. The first is the decline in the cost of circuits. Between 1982 and 1988, the cost of a 9.6Kbps leased circuit between Hong Kong and the U.S. declined more than 20%. In addition, discounts for multi-circuit hubbing caused the effective rates to be reduced further.

Over the same period, the cost of higher speed circuits (48-50Kbps) declined by approximately 32%, indicating the trend that users want higher-speed circuits.

Discussions with users indicate that there is a continuing trend toward the use of higher speed circuits. Growth rates in AVD versus high-speed circuits (50KB plus) over the next five years are indicated in Exhibit VI-11. During the same period, there is expected to be only nominal growth rate in low speed (TTY) grade circuits, and there could be some decline.

EXHIBIT VI-11



#### e. Public Data/Value-Added Network Services

With a basic infrastructure well in place, both Hong Kong Telephone and C&W are turning their attention increasingly to public network and value-added services.

Currently, a number of value-added services are available (Exhibit VI-12), and nearly all marketable services are open to consideration.



## EXHIBIT VI-12

**HONG KONG  
VALUE-ADDED SERVICES/PROVIDERS**

- Dialcom
- Fonemail
- Infonet
- Videoconferencing
- Data Base Access
- Fast FAX

**f. ISDN Services**

Among the services provided and being considered, ISDN is not a significant priority with either Hong Kong Telephone or C&W.

At the present state of development, neither of the providers can see specific applications that are in demand by the user community.

Both providers acknowledge the value of the additional services that will result from ISDN and agree that the overall quality of phone service will be improved, but cannot readily identify services that are needed today.

There is general consensus that neither Basic Rate nor Primary Rate services will be available until at least the mid- and, more than likely, the late-1990s.

**4. National Telecommunications Issues**

In Hong Kong, the key issue relates to the impact of the government change on the future of telecommunications.

At the present time, the general consensus is that there should be little short-term impact. However, a number of users have indicated that their plans include ongoing considerations of options should the situation change.

- One user indicated that their plans are structured to ensure 'rapid redeployment' of resources in the event that departure from Hong Kong becomes necessary (or desirable).
- A number of other users have indicated that they are more seriously considering Singapore as a hub location for future expansion, as an alternative to continuing expansion in Hong Kong.

## 5. User Needs and Requirements

Having generally few concerns with the overall environment in Hong Kong, the majority of users indicated that their key requirements were for greater functionality.

The areas that were most frequently mentioned as needs and requirements were for the interconnectivity of networks, greater E-mail capability, and EDI.

- Since the majority of users in Hong Kong also conduct business in other Southeast Asia countries, the ability for internetwork processing is a key requirement, since the international service providers vary between countries.
- EDI is mentioned by many users as a growing need. They are concerned about the reluctance of many of the groups in Hong Kong to accept a fully electronic EDI capability.

## D

### Indonesia

## 1. Introduction

With a geographic area that covers 13,000 islands and an economy that has done little to contribute to national development, Indonesia has made some strides in developing telecommunications services, but remains seriously lacking.

All indications are that the situation will not change quickly. However, the international provider has indicated keen interest in developing relationships that will be mutually beneficial and will contribute to national development.

With the recent announcement of new cooperative development agreements, the country could begin to see development over the next several years.

## 2. Economic and Political Setting

Characterized by some as a nation stirring from its political slumber, recent elections resulted in a 90% turnout and a 73% plurality for the

ruling Golkar party. However, the conduct of the election indicates the potential of problems below the surface.

The government is reported to have stage-managed the election to ensure the success of the government-supported party. Accounts indicated that the success of the election rested not as much on the popularity of the party as on ample funds spent in the villages and arm twisting.

In addition, a number of minority parties were effectively barred by a series of election laws that permit the 'screening' of political texts. A number of candidates are reported to have been effectively 'screened' from campaigning.

While the overall governmental structure appears to be generally stable and is not expected to change in the near term, there are two potential threats to the future stability of the country. The first is a growing influence of the Muslims. The other is the youth.

- Muslims have been effectively barred from the election process by the Pancasila law (to promote harmony among people), which prohibits religious and social organizations from participating in political processes.

Representing an estimated 90% of the population, the Muslims are beginning to form coalitions with Christian groups that would like to see changes in the government.

- The youth of Indonesia is taking an increasingly active interest in the political process. It is reported to be increasingly dissatisfied with the 'do nothing' approach to changes in the country.

While no short-term changes are expected, increasing interest in the government process by the Muslims and youth, coupled with a restiveness in the military to have a greater say in the government process and an increase in a number of controls over the press, suggests an underlying tension that cannot be ignored over the next several years.

Economists suggest that 1987 may be remembered as the year of domestic upheaval in the Indonesian economy. The increasing deterioration in confidence when a number of the macro-economic indicators are up is believed by some to result from:

- A growing lament over the slow pace of reform
- The persistence of well-connected monopolies
- A lack of information about the succession of the country's leadership

A general unhappiness with the progress of country's economy stems



from the 31% devaluation of the currency in 1986. Expected by many to provide a stimulus, the results are reported to have been generally cosmetic, allowing the country to balance its international books.

The devaluation, coupled with a relaxing of a number import/export regulations, was expected to provide a stimulus that has not been seen by the majority of the population. The population has become increasingly concerned with:

- Lack of signs of growth in the economy
- An apparent lack of government muscle on reform issues

Overall, the economy is reported to be in stable condition and there is anticipation that recent changes by the Ministry of Research and Technology could provide stimulus to the economy.

The Ministry recently announced a policy for the management of large investment projects called the Build, Operate, Transfer concept.

Under this concept, foreign investors will be encouraged to participate in the operating management (and financial return) of their investments and, through education programs, transfer technology to Indonesian citizens.

With an indication of some privatization of industry, the economy of Indonesia is expected to take a turn for the better, barring major natural disasters such as those that have affected the agricultural sector.

However, economists anticipate that unless there are conditions that stimulate investment, the economy could continue to languish, providing the basis for more social unrest and an ultimate change in the government.

### **3. Telecommunications Services and Plans**

#### **a. Telecommunications Organizations**

Organized under the Department of Tourism, Posts and Telecommunications, telecommunication services are provided by two separate organizations: Permutel and INDOSAT (Exhibit VI-13).

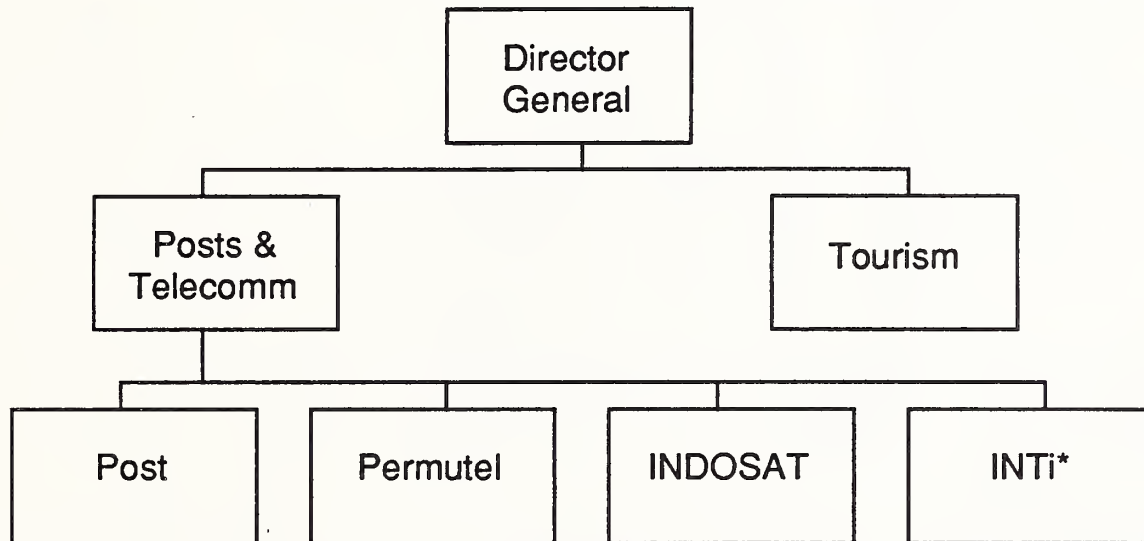
Permutel has responsibility for providing domestic telecommunication services to a population spread across more than 13,000 islands.

Of the numerous islands spread across a wide geographic area, the five islands of Sumatra, Java, Borneo, Sulawesi, and Irian Jaya account for the majority of the requirements for interactive (telephone, telex, etc.) telecommunications services.



## EXHIBIT VI-13

## INDONESIA TELECOMMUNICATIONS ORGANIZATION



\* VHF, Earth Stations, Telephone Sets, Mobile

INDOSAT has the responsibility for providing international telecommunications services for residents of all the islands.

International services are currently provided through two international gateways: one in Jakarta and one in Medan, inaugurated in 1986.

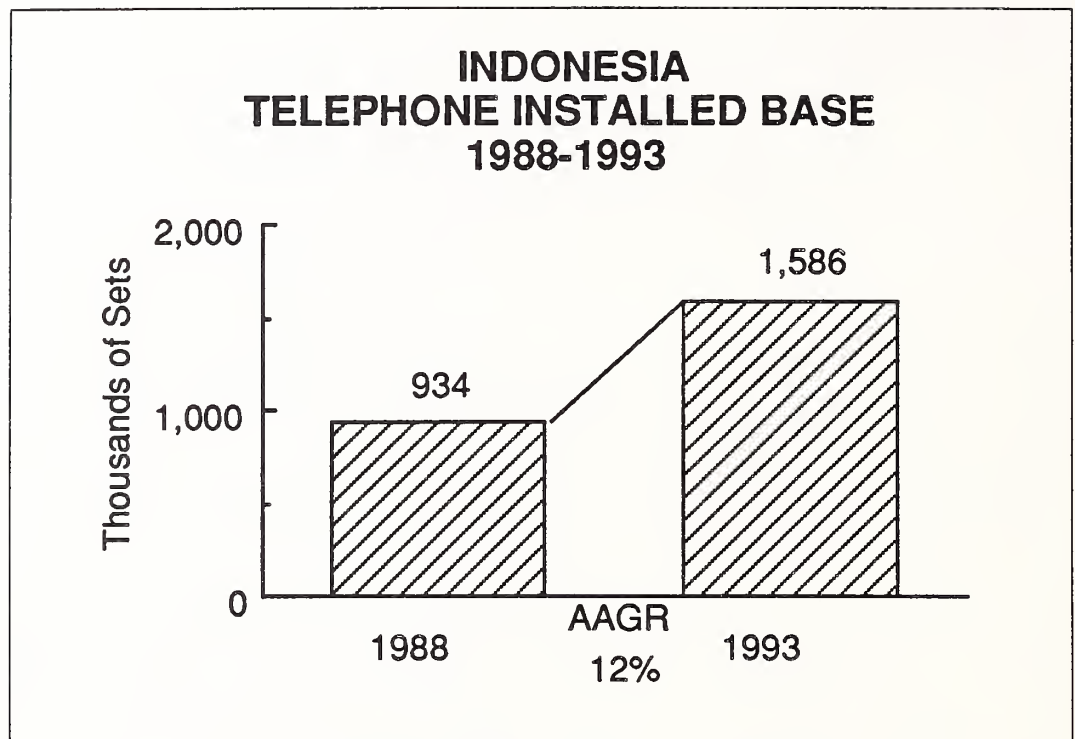
### b. Voice Services

Representing an estimated 70% of the revenues for Permutel and INDOSAT, telephone services continue to represent the majority of the focus for both domestic and international carriers.

While the government has been attempting to enhance domestic and international services, domestic services and facilities remain underdeveloped. The state of underdevelopment is expected to continue for at least the next several years.

Currently, there are an estimated 900,000 telephones in Indonesia. For the past several years, the rate of growth for telephone services has been between 10% to 12% per year. This growth rate is expected to continue and should result in an estimated installed base of approximately 1.5 million by 1993. (Exhibit VI-14)

EXHIBIT VI-14



While the figures could suggest steady growth, they must be considered in light of the backlog of orders for service. Currently, there are an estimated 200,000 outstanding requests for telephone service.

Of the total telephones in Indonesia, an estimated 35% are in Jakarta. This proportion is expected to continue for at least the next several years. Jakarta represents 85% of all outgoing international telephone traffic.

Considerations related to domestic and international telephone service include the following:

- International direct distance dialing is currently available from ten cities. The number is not expected to increase significantly over the next five years.
- Users consider international services to be of significantly higher quality than domestic service. The overall quality of telephone service is rated 'very low' by users. However, international service is rated generally acceptable.
- Call detail on telephone bills is currently not provided and is not considered to be high priority. The administrations believe that this type of information creates too much additional paper.
- One of the new services being considered is an international '800' service. Negotiations are currently underway for implementation of this type of service, and a pilot program is anticipated by 1989 or 1990.

- Connection of a user's PABX to a leased circuit is not permitted, and permission is not expected for some time to come. Currently, the domestic network is predominately analog and conversion to digital is not expected for at least eight to ten years.
- Telephone equipment is available both from the authorities and private vendors. Equipment approval is provided by INTI, the department that has responsibility for domestic telephone equipment.

Cellular telephone services have not made any significant inroads into the overall service infrastructure, as yet. From the little information that was available, cellular telephone appears to be a service that will become increasingly available over the next three to five years.

### c. Text Services

In addition to basic telephone services, telex services are a mainstay of services in Indonesia; however an overall decline is beginning to be noted.

From 1982 to 1984, international telex volume (transmission minutes) increased from 20 million to approximately 24 million. Between 1984 and 1986, a decline of approximately 0.5% was noted.

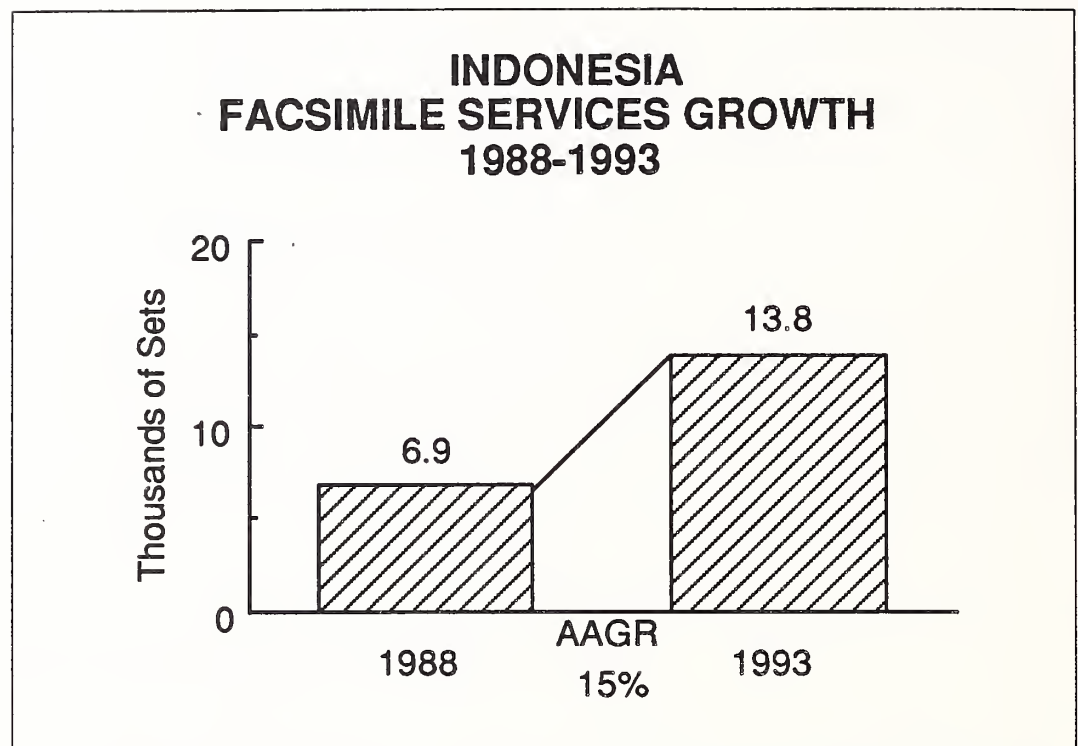
Contributing to the decline in in telex traffic has been a growing use of facsimile. The growth of facsimile has also been a contributor to the growth in telephone traffic.

- There are currently an estimated 5,000 to 6,000 facsimile units installed. However, the authorities indicated that the actual number could be higher, since they do not have an effective means to count or control the growth of the units.
- The majority of the facsimile units are illegally operated. While Permutel expressed some concern over the illegality, INDOSAT does not consider the situation to be of significant concern.

Overall, text-based services are expected to be a mainstay for some time to come. While the authorities were unable to provide a projection of the growth of facsimile services, users indicated that they expect growth to be in the range of 10% to 15% per year.

Exhibit VI-15 provides an estimate of the growth of the facsimile market in Indonesia for the next five years. However, caution in use of the figures is recommended, since the installed base could actually be double that which is shown, resulting in significantly higher market potential for the country.

EXHIBIT VI-15



#### d. Leased Circuit Services

To date, leased circuit services have not been a major part of the overall growth of telecommunications services in Indonesia.

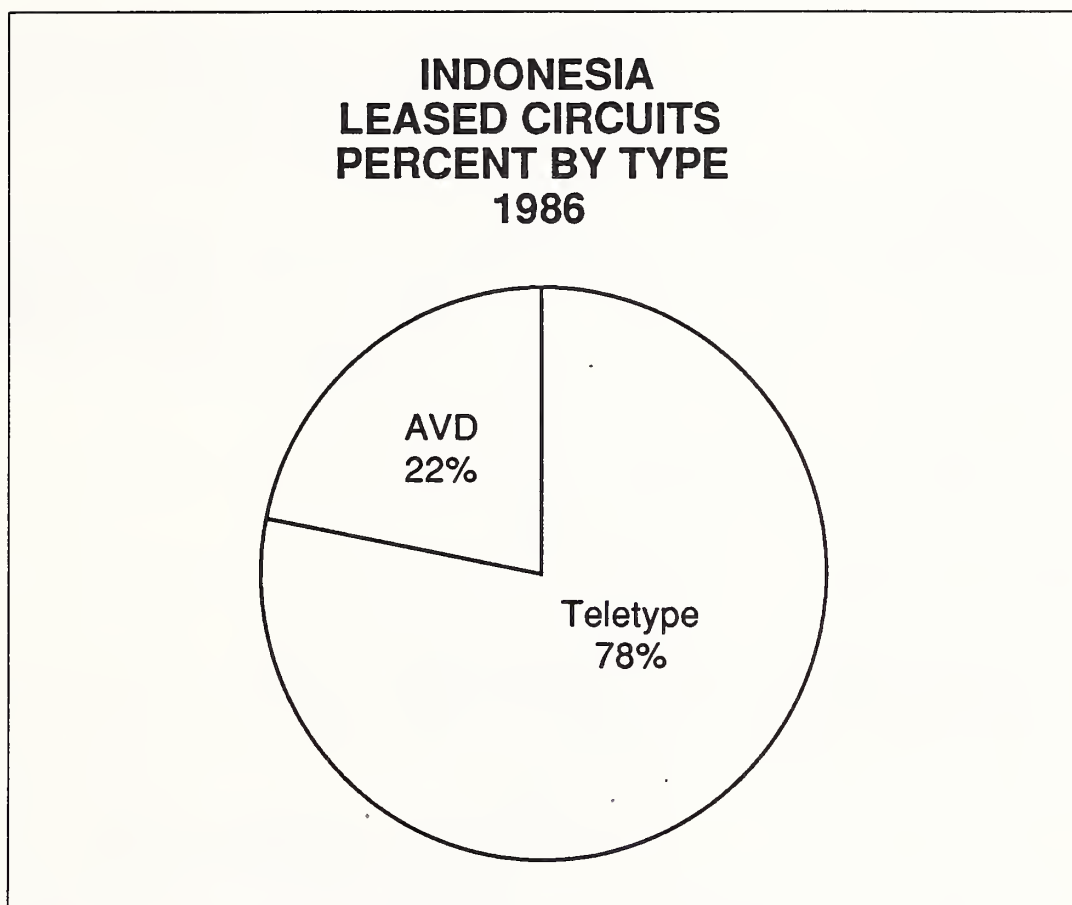
As of the end of 1986, there were a total of 144 lines in operation. Of these, 115 (78%) were teletype grade and 29 (22%) were AVD grade. (Exhibit VI-16)

Most users in Indonesia do not project significant short-term growth in the use of leased circuits for several reasons.

- Domestic leased circuits are in short supply and difficult to obtain. Users generally experience long lead times or must obtain circuits from 'brokers'.
  - The brokerage of leased circuits is technically illegal, and both Permutel and INDOSAT are trying to reduce the incidence of the practice.
  - INDOSAT has indicated that they are less inclined to monitor or take corrective action on a circuit that is known to be brokered.
- Currently, the highest permissible line speed is 2400bps. While users are free to use a circuit at any speed that they wish, the authorities only guarantee 2400bps. INDOSAT indicates that a number of users are operating at speeds up to 19.2Kbps.



## EXHIBIT VI-16



However, a number of developments could change the environment over the next several years, particularly for companies operating in Jakarta.

- In addition to the planned expansion of the number of available circuits, studies are currently underway to provide IBS service in the Jakarta and Medan areas.
- With the availability of high-speed circuits and the ability to share circuits, the possibility for users to have higher speed, higher quality services could be only a couple of years away.

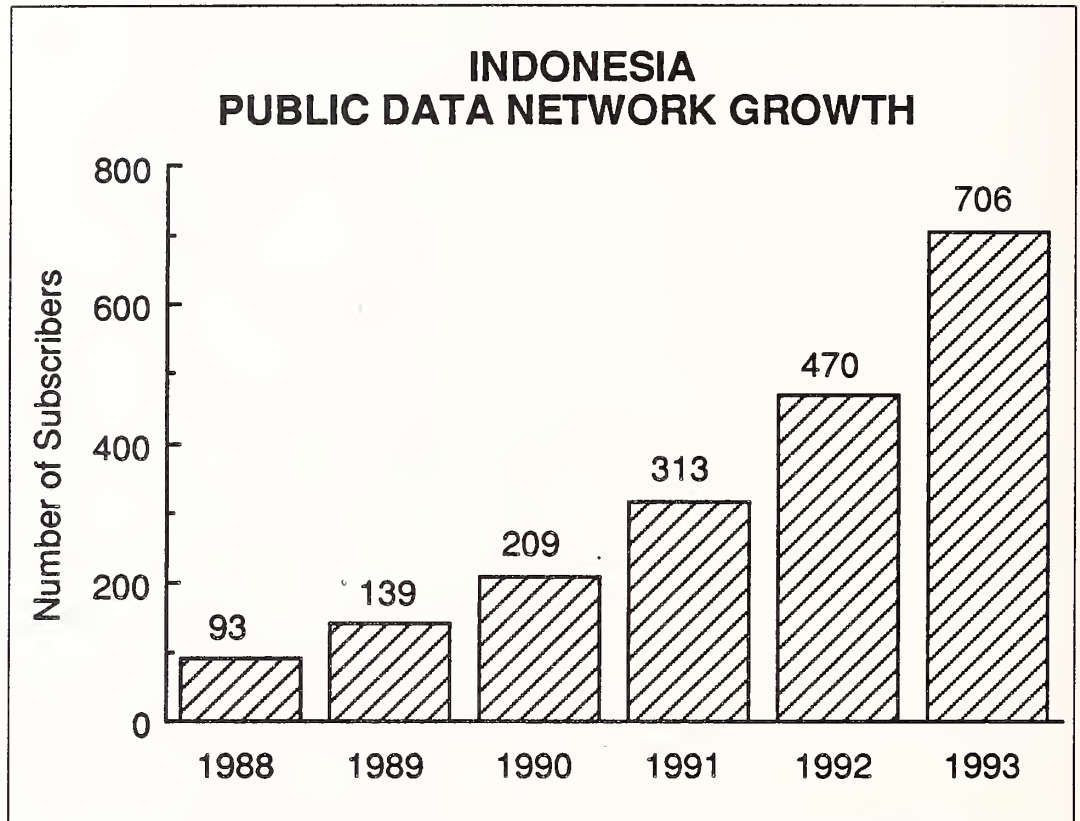
**e. Public Data/Value-Added Network Services**

Indonesia's public data network is comparatively new and, while the number of users and volume of data are still relatively low, the service is expected to grow significantly over the next several years.

As of the end of 1986, there were an estimated total of 93 users of the national network SKDP. Of these, 86 were dial-up subscribers and 7 were leased line users.

Between 1985 and 1986, use of the network grew by an estimated 170%. While users project overall growth to be somewhat less, the authorities project growth of the public data network to be nearly 50% per year for the next five years. (Exhibit VI-17.)

EXHIBIT VI-17



As an enhancement to the public data network, the authorities are currently studying X.400 and expect to implement the standard, along with Message Handling Services, sometime in the next three years.

INDOSAT stated that they do not have any specific agreements for service with organizations such as CSC, GEIS, IBM, etc. However, they indicate a willingness to establish arrangements with one or more organizations.

#### **f. ISDN Services**

As in most countries, ISDN is a consideration for the future, but neither Permutel nor INDOSAT currently have specific plans to implement ISDN-related services.

The key reason is the lack of a national infrastructure that will support digital services. While there are a number of digital exchanges being implemented, significant additional work is needed before ISDN services can be considered.

The general consensus is that a minimum of eight to ten years will be needed before ISDN can be considered.

#### **g. Other Services and Developments**

There are a number of projects underway that could begin to alter the overall infrastructure in Indonesia, over the next several years.

- Plans to provide IBS service will provide higher capacity in major areas such as Jakarta and Medan.
- A government five-year plan provides for a modernization program that is expected to double the number of telephones by 1992.
- The government has entered into an agreement with Scientific America for installation of earth stations at 26 sites.
- NTT (Japan) has won a contract to design a public communications network that will provide 590,000 telephone circuits through 55 offices in seven cities.

#### **4. National Telecommunications Issues**

As in many lesser developed countries, one of the key issues facing Indonesia is the allocation of national resources to build an acceptable infrastructure.

To date, Indonesia has made the choice of focusing on the development of telecommunications services that will promote education and information dissemination through a greater part of the population.

The country has planned and implemented earth stations in remote areas of the country to provide educational broadcasts rather than spend the funds on enhancing infrastructure that provides no (or little) benefit for the majority of the country. This trend is expected to continue.

#### **5. User Needs and Requirements**

In Indonesia, particularly outside the metropolitan area of Jakarta, users are in need of the most basic of services. The infrastructure is seriously lacking and the quality of services that are present are frequently of poor quality.

International services are reported by users to be better than domestic services, but the lack of domestic services frequently precludes effective service.



The general expectation in Indonesia is that there will be few changes in the short term.

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**E****Japan**

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**1. Introduction**

The general trend in Japan over the next five years is for general stability and continued growth. Within the telecommunications industry, users indicated a moderate degree of hope that the recent liberalization and privatization will result in greater flexibility and alternatives in the development and use of network services.

**2. Economic and Political Setting**

Representing one of the leading industrial nations of the world, Japan's economic infrastructure is strong and is expected to remain so for the next several years. However, there are undercurrents that could begin to alter Japan's position in the world economic community.

- While the government is stable, there have been recent signs of unrest on the part of unions and minor political parties to implement land and tax reforms to ease burdens on the population. Although not currently significant in their strength, their participation in the government process is expected to increase over time.
- There has been an increasing pressure by other industrialized nations for Japan to "share the wealth." As a result of the pressure, the number of cases of Japan's direct overseas investment increased by 25%, from 2,563 cases in 1981 to approximately 3,196 cases in 1986. During the same period, the financial commitment increased from an estimated \$8.9 billion to more than \$22 billion, an increase of nearly 150%.

During the past several years, the Japanese government has shown increasing willingness to take on greater degrees of responsibility in ensuring the stability of the international financial community. Japan has been one of the key participants in helping the 'shore up' the U.S. dollar.

The participation in international economic stabilization has resulted in a general decline in the volume of exports, as the value of the Yen has increased significantly. A number of economists suggest that the value of the Yen (compared to the U.S. Dollar) could increase to as high as 115.

At the same time, Japan's growth in GNP has remained strong due to increases in domestic demand. A number of economists indicate that Japan will grow at the projected rate of 3.5% for 1988, as compared to 2.5% in the previous 12 months and 4.3% the year before.



Overall, Japan's economy is expected to remain strong, with more emphasis on increasing consumer demand that may, in part, offset decreases in foreign trade

### **3. Telecommunications Services and Plans**

#### **a. Telecommunications Organizations**

Following years of highly centralized and regulated services, deregulation in Japan began with passage of the Telecommunications Business Law, which became effective on 1 April 1985.

Since passage of the Law, Japan has seen significant increases in the number of service providers; many are seeking to achieve competitive advantage in niche markets.

Deregulation is having a dramatic and far-reaching effect. One of the most significant changes brought about by the Law is an effective change in the status of NTT (Nippon Telephone and Telegraph) and KDD (Kokusai Denshin Denwa).

Once the sole providers of domestic and international services respectively, the status of both has changed to one of being, essentially, common carriers; not dissimilar to the BOC's in the U.S.

- While both NTT and KDD can compete in the value-added business market, other firms are free to compete and establish rates and charges that are less than NTT and KDD. Both NTT and KDD must demonstrate the lack of cross-subsidization from regulated to non-regulated services.
- As a Type I carrier, NTT and KDD are obligated under the Law to provide unrestricted common carrier services to the new service providers.
- While the Law provides for competition by foreign firms in the provision of common carrier services, few are entering the market, due to the high costs of entry.

While the Law has permitted entrants into both the domestic and international market segments, the greatest impact has been on NTT, where a number of changes have taken place.

- NTT has sold a significant number of shares in the company, continuing to increase public participation.
- The change has caused NTT to have to become more streamlined and competitive. In order to be more competitive it has taken a number of steps.

- NTT has had to reduce the management layers to become more responsible to customer needs and reduce overhead.
- Since privatization, some 1,300 telephone centers have been consolidated into approximately 350.
- NTT is in the process of reducing its payroll by an estimated 30,000 people by the end of 1990.

Following formalization of service provider categories (Exhibit VI-18), more than 300 providers of public and value-added services have entered the market for domestic and international telecommunications.

EXHIBIT VI-18

### JAPAN SERVICE PROVIDER CLASSIFICATIONS

Industry Framework	Type I Carriers	Type II Carriers	
		Special Type II	General Type II
Business Activities	Provision of telecommunications services through own telecommunications circuits and facilities	Provision of telecommunications services through telecommunications circuits leased from Type I carriers	
		<ul style="list-style-type: none"> <li>• Large-scale nationwide or international services</li> </ul>	<ul style="list-style-type: none"> <li>• Other services</li> </ul>
Government Regulation			
a. Start-up of Services	<ul style="list-style-type: none"> <li>• Permission from MPT required</li> </ul>	<ul style="list-style-type: none"> <li>• Registration with MPT required</li> </ul>	<ul style="list-style-type: none"> <li>• Notification to MPT required</li> </ul>
b. Rates and Charges	<ul style="list-style-type: none"> <li>• Authorization from MPT required</li> </ul>	<ul style="list-style-type: none"> <li>• Notification to MPT required</li> </ul>	<ul style="list-style-type: none"> <li>• Unregulated</li> </ul>
Foreign Capital Participation	Proportion of total shares held by foreign nationals limited to one-third	Unregulated	Unregulated

Included in the group of New Common Carriers (NCCs) are more than 30 Type I carriers that are beginning to provide domestic and international competition to the domestic provider Nippon Telephone and Telegraph (NTT) and the international provider Kokusai Denshin Denwa (KDD).

Additional Type I carriers are expected to enter the market as the demand for new services expands beyond the Tokyo-Osaka corridor, where the majority of major business requirements currently exist.

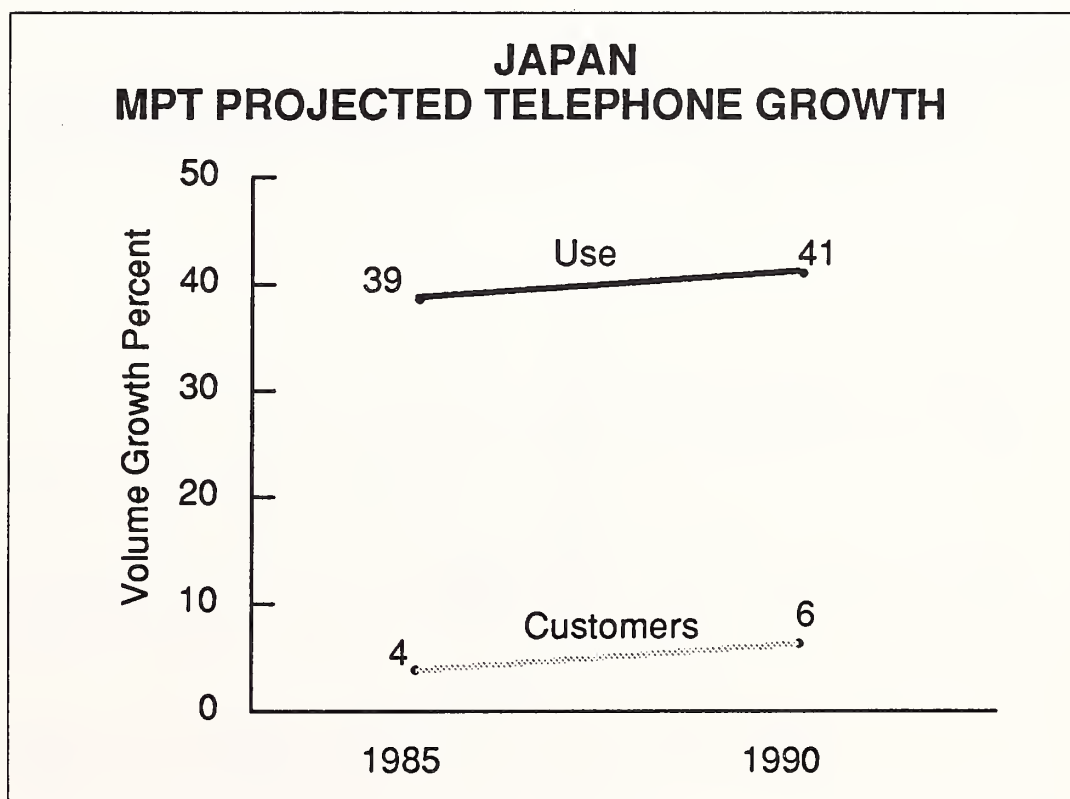
While there is a growing number of NCCs, NTT currently retains an estimated 96% of the domestic market for basic telecommunications services. KDD currently has a comparable share of the international market. Major international Type I carriers have, as yet, not begun to offer any significant amount of services.

### b. Voice Services

At the time the Telecommunications Basic Law was enacted, the MPT (Ministry of Posts and Telecommunications) prepared a projection of the growth of domestic and international telecommunications services for the period 1985-1990.

Included in the projections was an average annual growth rate for domestic telephone services of approximately 16%. Between 1987 and 1988 (Fiscal Year), NTT realized an increase of approximately 4%. (Exhibit VI-19)

EXHIBIT VI-19





For the same 1985-1990 period, the MPT projected an increase in telephone use of 213%. For the 1987-1988 fiscal year, the actual volume growth was 41%. This rate of growth continues a trend of high growth experienced over the previous years.

The growth rate for basic domestic and international telephone services are expected to continue for the next several years. However, following this initial period, these rates can be expected to decline in the ensuing years, as the transmission of facsimile, a key contributor to the growth in telephone services, begins to utilize other methods to accomplish transmission.

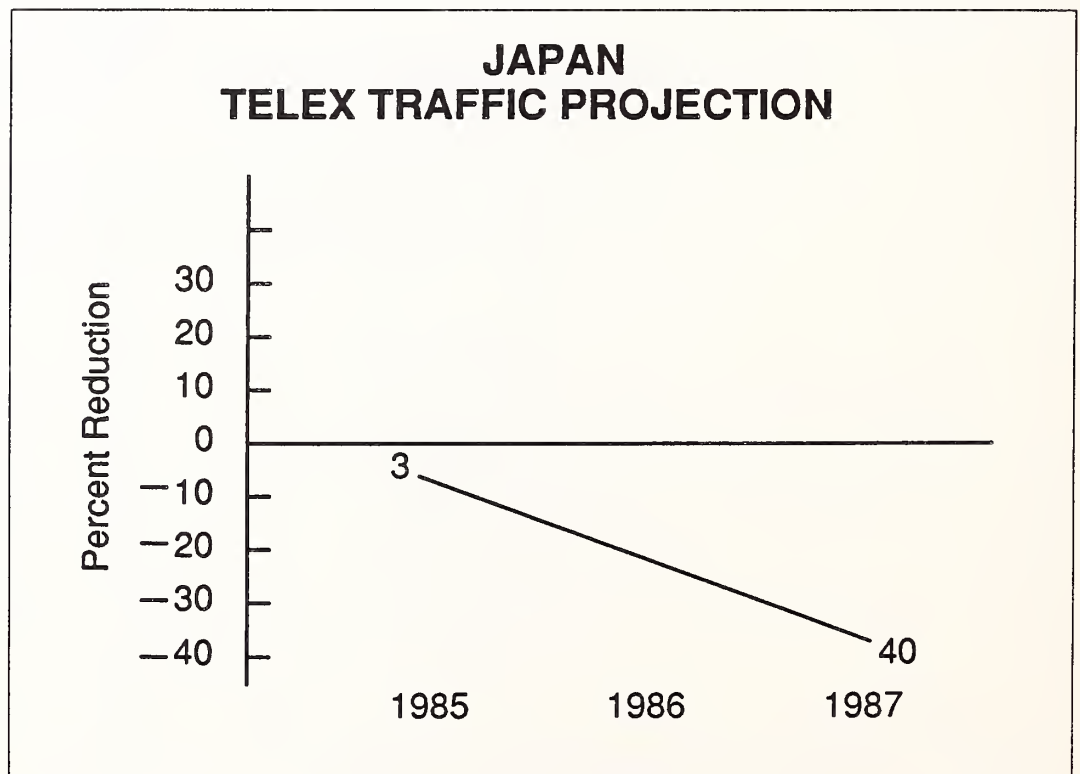
Cellular services are among the rapidly growing voice services. Cellular services are growing an estimated rate of 50% per year. The rate of growth is expected to continue for several years.

### c. Text Services

As in many countries, the volume of telex service in Japan is declining. The most significant indicator of this is the rate of decrease in the volume of international telex.

In 1985, the MPT projected zero (0) growth over the five-year period. The volume has been declining significantly. As shown in Exhibit VI-20, the actual rate of decline has increased from approximately 3% to nearly 40% per year.

EXHIBIT VI-20





Over the next five years, both NTT and KDD project a continued trend of comparable increases and decreases for telephone and telex respectively. The projections are greater than originally expected due to tariff reductions and promotion of services that encourage use and make usage easier.

Both NTT and KDD project a continued trend of decreasing tariffs due to the increased competition and significant expansion in the number of circuits. They estimate reductions that average approximately 10% per year.

#### **d. Leased Circuit Services**

For the period 1986-1991, the MPT projected growth for conventional and high-speed leased circuits to vary from a low of 12% to a high of nearly 1200% over the planning period.

Growth rates for domestic conventional leased circuits for the 1987-1988 (fiscal year) period increased by approximately 12% to a total of more than 640,000 circuits. The number of domestic high-speed digital circuits grew nearly 80%

During the same planning period, international leased circuits were projected to grow by more than 400%. For the period 1987-1988, the actual growth of international leased circuits increased by approximately 25%. This excludes the growth of international telephone circuits that increased by an additional 20%.

Domestic conventional leased circuit services are expected to continue to grow at an estimated rate of 10% to 12% (Exhibit VI-21). Growth of domestic high-speed digital services should continue to exceed an estimated 40% to 50% per year for the next two to three years (Exhibit VI-22).

#### **e. Public Data/Value-Added Network Services**

Public data network services continue to be a top priority for both NTT and KDD. In addition, since deregulation, some 500 companies have begun to provide or been granted permission to provide VAN services in Japan.

Public data network services provided by NTT fall into two general categories—data communication facility services and digital data network exchange services.

- Data communication facility services include services such as CAFIS (Credit and Finance Information System) and ANSER.

EXHIBIT VI-21

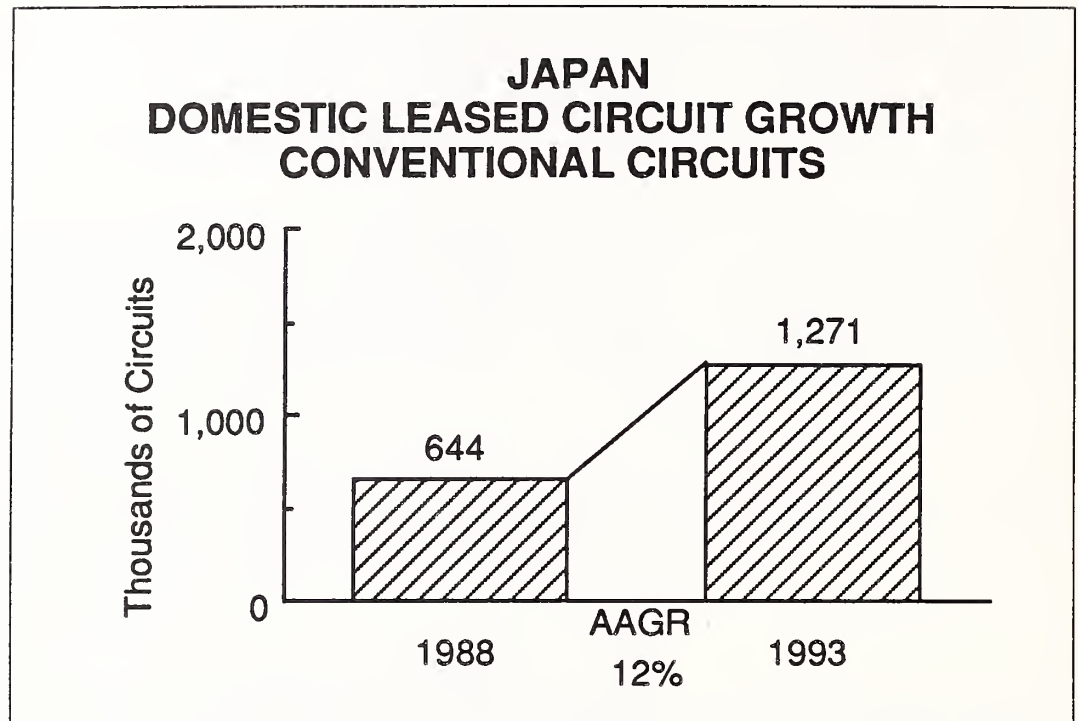
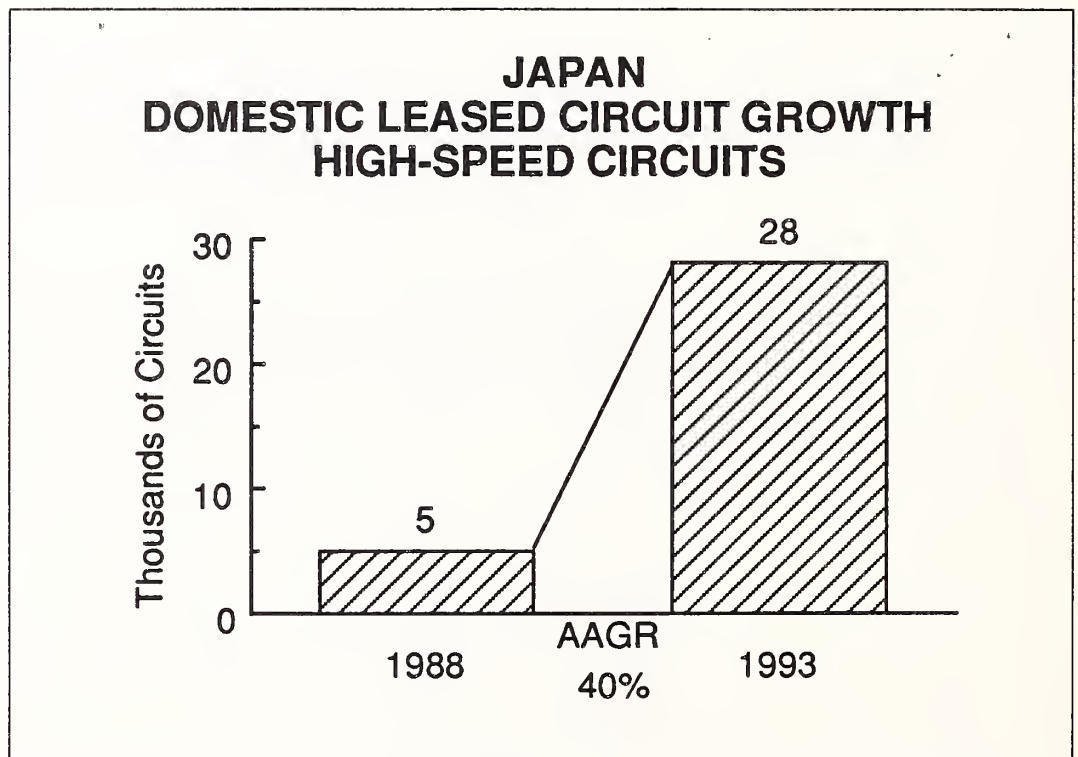


EXHIBIT VI-22



- CAFIS is a nationwide on-line system linking credit companies and retail stores nationwide to provide credit authorization—related services.

- ANSER is a nationwide system used primarily by banks, security firms, and retailers to provide information to customers requested by telephone, facsimile, or videotex terminal.
- Digital data exchange services include circuit switching services and packet switching services.
  - Designed to meet the need for lengthy and high-volume transmission, circuit switching services have been growing steadily. Between 1987 and 1988, NTT recorded an increase in circuit switch subscribers of more than 35%.
  - Designed to meet the need for shorter term, low-volume transmissions, packet switching services grew at a substantial rate, recording a growth rate of nearly 92% between 1987 and 1988.
- Recognizing the increasing need for high-volume transmission capability, NTT introduced the ability to transmit "Long Packets" early in the fiscal year, which provided the capability to switch fast packets of up to 4-kilobytes. Introduction was in response to demand primarily in the financial services sector.

With responsibility for international telecommunication services, KDD provides a number of packet and circuit switch services comparable to NTT. KDD's international and value-added network services include the following:

- VENUS-P is a packet switch system designed to be the primary means for lower volume users (business and private) to access foreign databases and corporate systems. In addition, VENUS-P provides the primary basis for providing value-added services such as E-mail.
- VENUS-C is the circuit switch switch system designed to meet the needs of users requiring high-speed, high-volume data transfer where no additional processing is required.
- VENUS-LP is a comparatively new offering intended to meet the growing need for high-volume, high-resolution transmission and switching services such as facsimile transmission and store-and-forward.

As Type I common carriers, neither NTT nor KDD have specific agreements for the marketing or provision of domestic or international value-added services. As part of their network services activities, each provides connections to major services providers throughout the world.

Both KDD and NTT express willingness to work directly or indirectly with national and international service providers that have obtained the necessary authority from the MPT to provide services.



#### **f. ISDN Services**

ISDN will continue to be a significant service consideration for the foreseeable future. In April 1988, NTT introduced INS-Net 64, a Basic Rate service, connecting the cities of Tokyo, Nagoya, and Osaka. NTT indicates that the service will be enhanced to provide Primary Rate service in 1989 and that expansion of the services will begin to other areas. Key driving forces for the implementation and expansion of ISDN-based services include the following:

- The need for high-resolution, high-speed facsimile has led to the significant growth of GII facsimile devices and stimulated the growth of ISDN-based services. Facsimile services are growing an estimated 50% percent per year. This growth is expected to continue for the next several years.
- ISDN services are needed to support the growth of videoconferencing services throughout the country. With the introduction of low cost videoconferencing terminals, and assuming that ISDN provides cost-effective rates, conferencing is expected to grow rapidly over the next several years.
- Videotex is growing rapidly. By the end of fiscal 1988, the number of videotex subscribers grew by more than 100% over the previous year to an estimated 62,000 subscribers. Expansion of ISDN capabilities will further stimulate the demand for videotex services.

#### **g. Other Services**

The number of service providers entering the Japanese market is significant. In the short term, the growth could create problems for users trying to select among the variety of offerings. However, the long-term prospect is expected to result in a number of new services at reduced costs. Included in the numerous changes taking place are the following.

- ATT has announced the availability of its ACCUNET service to provide 56 and 64KB clear channel service and a 1.5MB service between the U.S. and Japan.
- Tokyo Telecommunications Network Co., an affiliate of Tokyo Electric Co., will begin to offer a 3Mbps dedicated circuit service. The charge is expected to be between 8% and 19% less than NTT-comparable service.
- Three new common carriers, Daini-Denden, Inc., Japan Telecom, and Teleway Japan are now using an estimated 3.3 million circuits for international telephone service.



- K-Network International Inc., a VAN service, plans to launch an international VAN service linking Japan and the U.K. in 1989.
- NTT has begun to accept bids for the supply of a Message Handling Service (MHS) to provide E-mail service.
- Nihon Unisys, Ltd. has announced that it will double the number of circuits on its "U-NET" VAN in order to compete with IBM Japan.
- Nippon Idou Tsushin Corp. plans to offer cellular service in Tokyo. The company has signed contracts with 11 Japanese automakers for marketing and installation.
- Ace teletel international has reduced fees for E-mail sent to the U.S. by an average of 20%.
- International Telecom Japan (ITJ) has reached agreement with ATT to provide services between the U.S. and Japan.

There are numerous other service providers in Japan working to identify and enter special niche market areas. The majority are related to the provision of VAN and cellular services.

#### **4. National Telecommunications Issues**

Key national issues in Japan center around the continued liberalization of the market and services.

Most users indicate general acceptance with the changes that have taken place to date but are cautious about suggesting that further liberalization will follow.

In addition, a number of users express concern about the growth in the number of NCCs. A number have suggested that the government might initiate steps to slow down the rapid development and, in the process, slow down the liberalization trend that has emerged.

#### **5. User Needs and Requirements**

Key user concerns in Japan center around the general lack of network connectivity coupled with a growing concern over the emphasis being placed on public network-based services.

Users are beginning to sense a strong movement toward public network use, even though neither NTT nor KDD indicate that they give any preference.

Among the countries of Asia, users believe that Japan could be the forerunner of movements toward public network use. However, they believe that, with the growth of international leased circuit service companies, alternatives will emerge to offset the trends of NTT and KDD.

Overall, users are pleased with what they have seen and are hopeful that the trends will continue.

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**F****South Korea****1. Introduction**

Although it is one of the most dramatic areas of growth in the Asia/Pacific region, South Korea also has one of the most restrictive environments for the use of telecommunications services.

Unfortunately, little is likely to change in the next few years. The national authorities have made a clear statement that the policies are intended to promote and protect the development of local providers.

However, there is an indication that KTA (Telecommunications Authority of Korea) could be privatized beginning in late 1988 or early 1989, potentially setting the tone for other developments in the next couple of years. Until then, little is expected to change.

**2. Economic and Political Setting**

Contemporary Korea dates from 1945 when liberation from Japan was realized. From 1945 through 1960, the country experienced almost continuous upheaval with numerous governments being formed and changed.

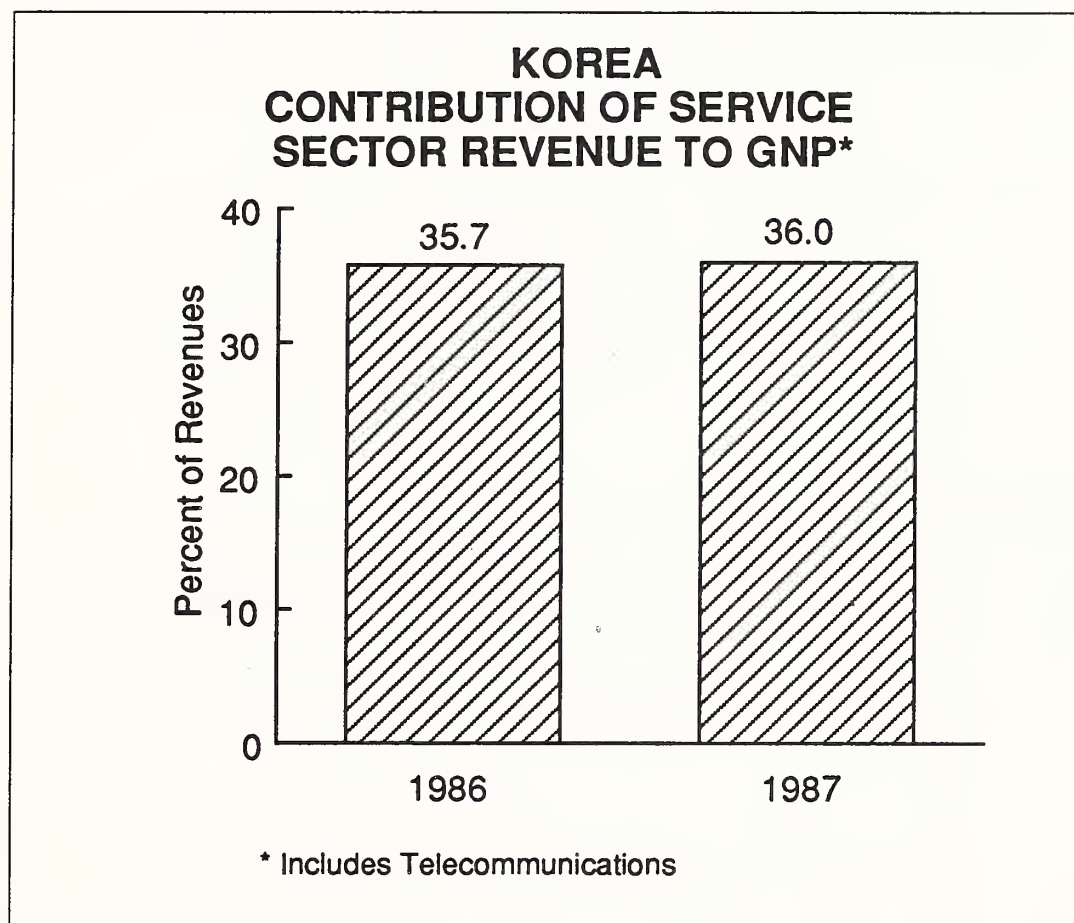
Comparative stability was achieved with the formation of the Second Republic in 1960. However, turmoil has been experienced continually, resulting in the formation of the Sixth Republic in December 1987. The Sixth Republic was the first government formed by direct popular presidential election.

The future of South Korea is unknown. The economy has been growing dynamically, but there has been increasing agitation for increased liberty by an increasingly well-educated population. In addition, there has been increasing pressure for reunification with North Korea. Recently Prime Minister Roh has proposed steps to achieve a degree of cooperation as a (possible) first step to unification.

During 1987, the economy grew 12.2%, matching the growth for 1986 and nearly matching the record growth of 1977 (12.6%). This performance resulted from strong performance in exports and decreased payments of foreign debt. During the same period, the Gross National Product grew by \$22.9 billion (U.S.) to \$118 billion.

Between 1986 and 1987, the service industry (including telecommunications) contributed 36% to the Gross National Product, up from 35.7% in 1986 (Exhibit VI-23).

EXHIBIT VI-23



As a key indication of confidence in the stability of the economy, domestic savings represented 35.8% of the Gross National Product, up 3% from the previous year. Domestic savings surpassed growth of investments, satisfying investment demand.

Though the economic growth has been significant, the success has been less than enthusiastically accepted by a number of people. Due to this success, representatives in the U.S. Congress have proposed eliminating (or significantly reducing) the General Systems of Preferences (GSP) on products produced in South Korea. Reduction could result in the introduction of import duties of 4.5% on goods imported into the United States.

Even considering the possibilities of changes in international economic relationships and the political changes beginning to take place, South Korea is expected to remain comparatively stable and continue its high level of economic growth for the next several years.



### 3. Telecommunications Service Summary

#### a. Telecommunications Organizations

Formed in 1981 and 1982 respectively, the Telecommunications Authority of Korea (KTA) and DACOM have authority for all telecommunications services in South Korea. With one exception, there are no third-party providers.

- KTA (Telecommunications Authority of Korea) has responsibility for the development and management of all telecommunications network infrastructure and providing all national and international telecommunications services, including telephone, telex and leased circuit services. Services provided by KTA include those identified in Exhibit VI-24.

EXHIBIT VI-24

#### **KOREA TELECOMMUNICATIONS AUTHORITY OF KOREA SERVICES**

- Domestic/International Telephone
- Domestic/International Telex
- Domestic/International Leased Circuit
- Bureau Facsimile Services
- Voice Mail Services
- Maritime Communications
- Mobile Telephone
- Radio Paging

- DACOM has responsibility for providing network-based services. In addition, DACOM has responsibility for leased circuit services directly related to connecting customers to public data network services.



As an adjunct to the network services, DACOM has responsibility for marketing leased circuits. While the division of responsibility has caused confusion for many customers, DACOM indicates that its responsibility is to market, review, and approve applications for leased circuit applications only. KTA has the responsibility for providing and maintaining leased circuit services. Services provided by DACOM are indicated in Exhibit VI-25.

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**EXHIBIT VI-25****KOREA  
DACOM SERVICES**

- Electronic Mail
- Data Base Access
- Videotex (Chollian)
- DCS (DACOM Computer Services)
- CCIS (Credit Card Information System)
- DACOM-NET (Packet Network Services)
- KOTIS (Korea Travel Information Services)
- POSCO (National EDI Service)

In addition to the services provided by DACOM, GEIS currently provides international VAN services. Technically illegal (as indicated by DACOM), GEIS is permitted to continue providing service since it was providing service prior to the establishment of DACOM.

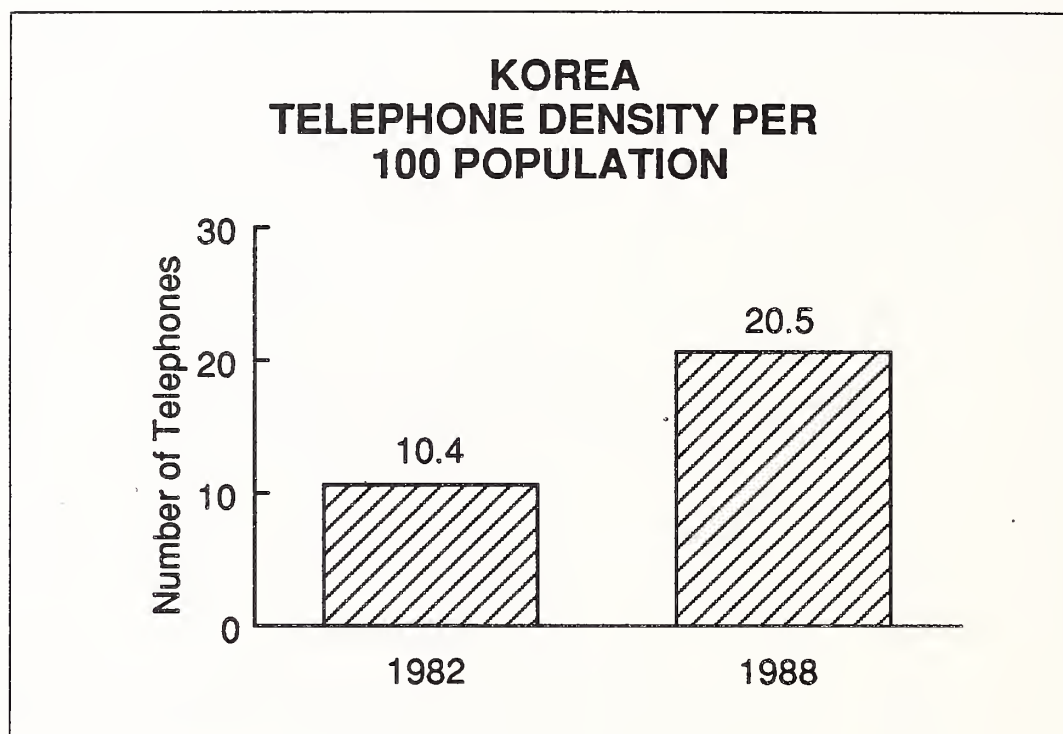
Though DACOM indicates that permission to provide service will not be withdrawn, it indicates that significant expansion of service is doubtful in areas where DACOM believes it has the capability to provide the service.

Following years of limited growth, telecommunications services in South Korea have grown significantly in the past five years and growth is expected to continue for the next several years. Significant growth has been experienced in the following areas.

### b. Voice Services

From 1982 to 1987, the total telephone switching capacity grew by more than 100% from 4.4 million to 10.2 million. During the same period, the number of telephones grew by 97%. As a result of this growth, South Korea has one of the highest densities of telephone service of any country in Asia (Exhibit VI-26).

EXHIBIT VI-26



Cellular telephone service, provided through a subsidiary of KTA, has experienced steady growth since its introduction in 1984. As of the end of 1987, there were an estimated 10,000 units installed. With continuing demand and expansion to additional major areas of the country, the growth rate is projected to be at least 15% for the next five years, resulting in an estimate of more than 20,000 units by 1993 (Exhibit VI-27).

### c. Text Services

Though telex traffic has generally been declining as facsimile and other services grow, the volume of telex traffic in South Korea has been growing moderately, reflecting residual subscriber demand for some basic services.

Between 1982 and 1988, the telex switching capacity grew by approximately 20% and the number of subscribers grew by 65% (Exhibit VI-28).

EXHIBIT VI-27

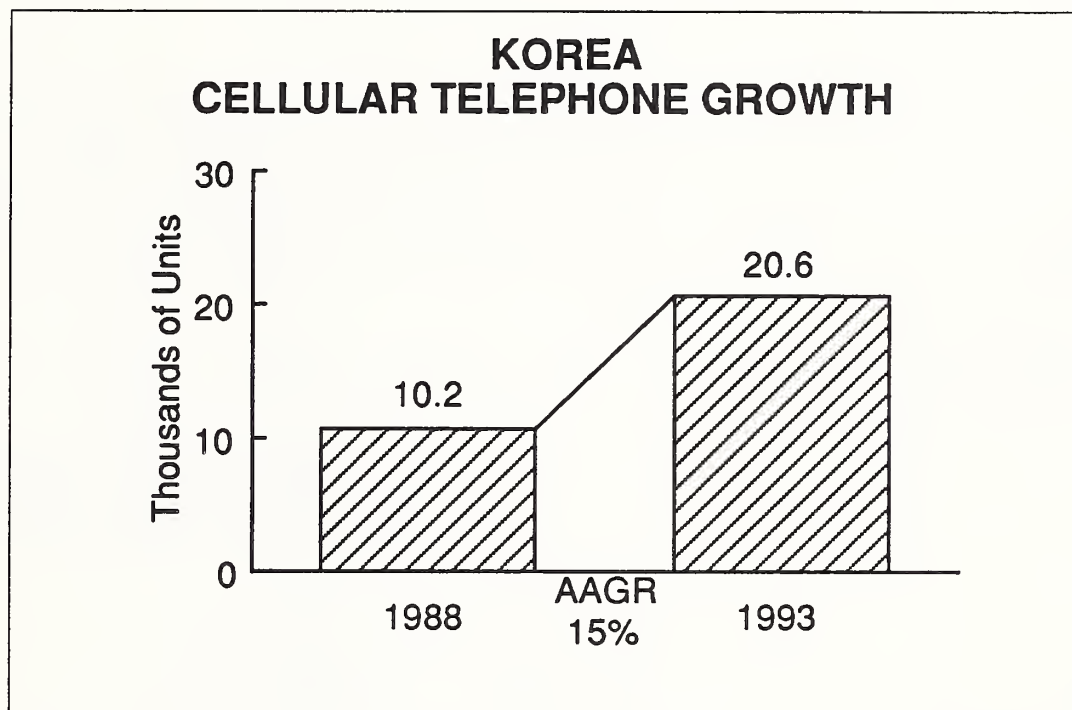
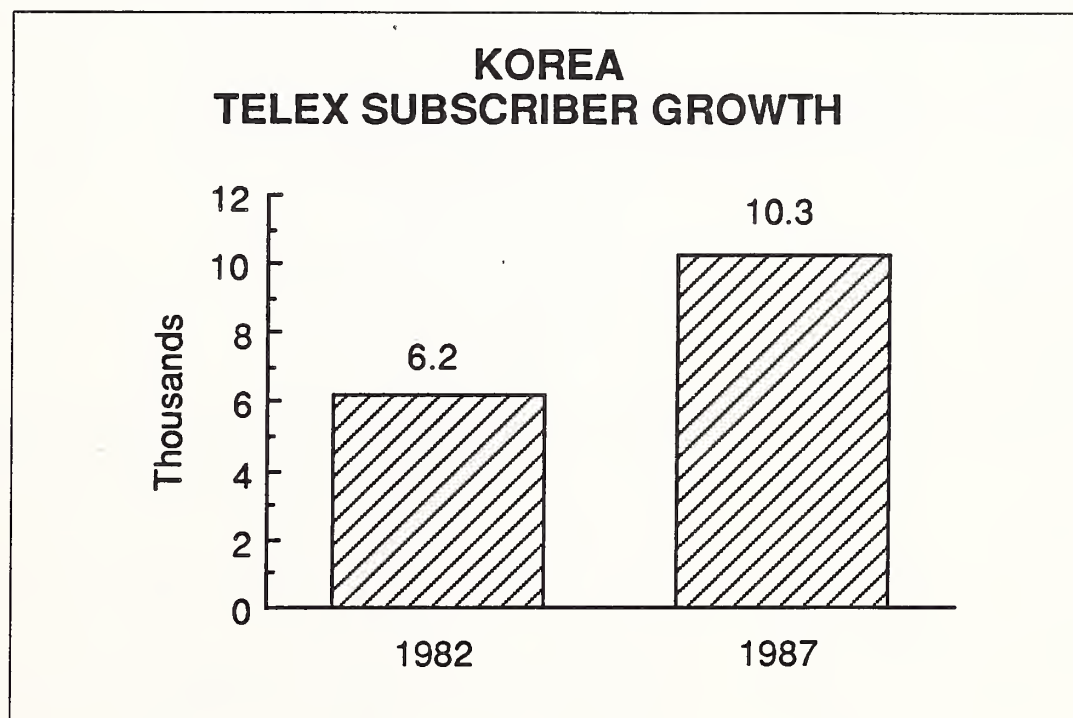


EXHIBIT VI-28

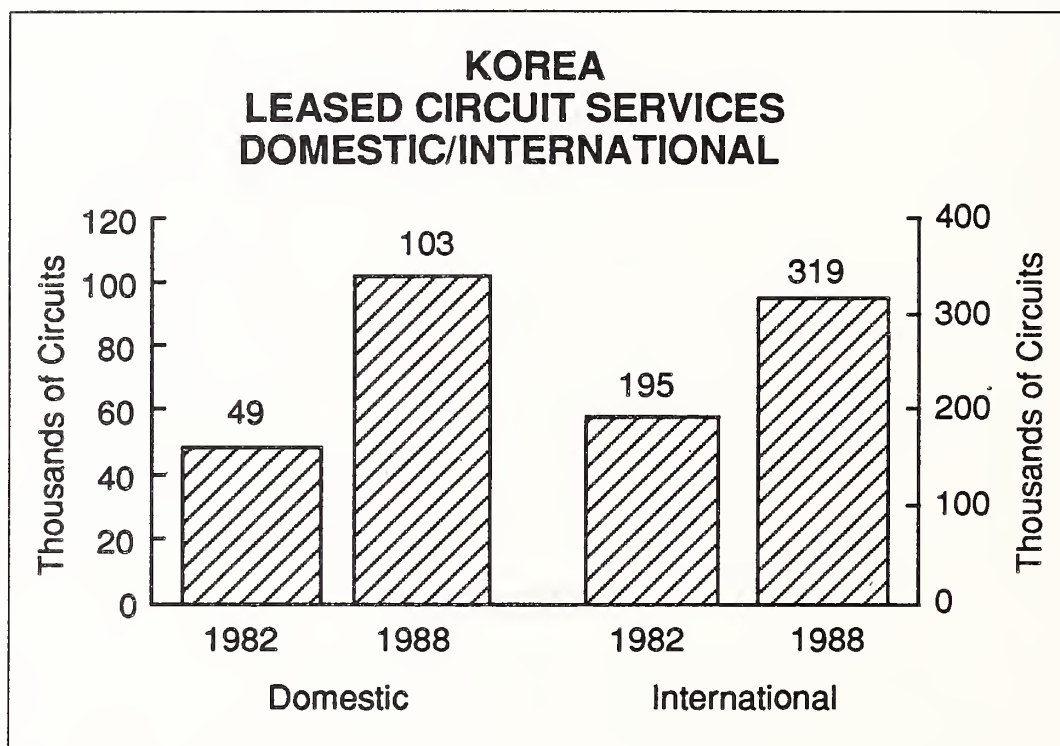


With the continuing growth in demand for facsimile and the emergence of domestic and international E-mail services, the growth for telex services is projected to begin to decline at a rate of 10% per year.

#### d. Leased Circuit Services

Comparable to domestic and international telephone services, the growth of domestic leased circuits has been significant over the past five years. Though not as great as domestic growth, the growth in international leased circuits has also been significant. Growth of domestic and international leased circuit services for the past five years is shown in Exhibit VI-29.

EXHIBIT VI-29



Over the next five years, the demand for leased circuits is expected to increase, with the highest demand for higher-speed (wideband) services.

Over the next five years, demand for leased circuit services is expected to be an estimated 10-12% per year, which includes an overall annual reduction in low-speed circuits of 2-3% per year (Exhibit VI-30).

#### e. Public Data/Value-Added Network Services

Though the rate of growth has been declining over the past several years (Exhibit VI-31), the overall growth of public data network services has been continual. With the initial demand (predominantly domestic) generally satisfied and with attention focused away from the short-term needs of the Olympics, DACOM now expects the rate of growth to increase.



EXHIBIT VI-30

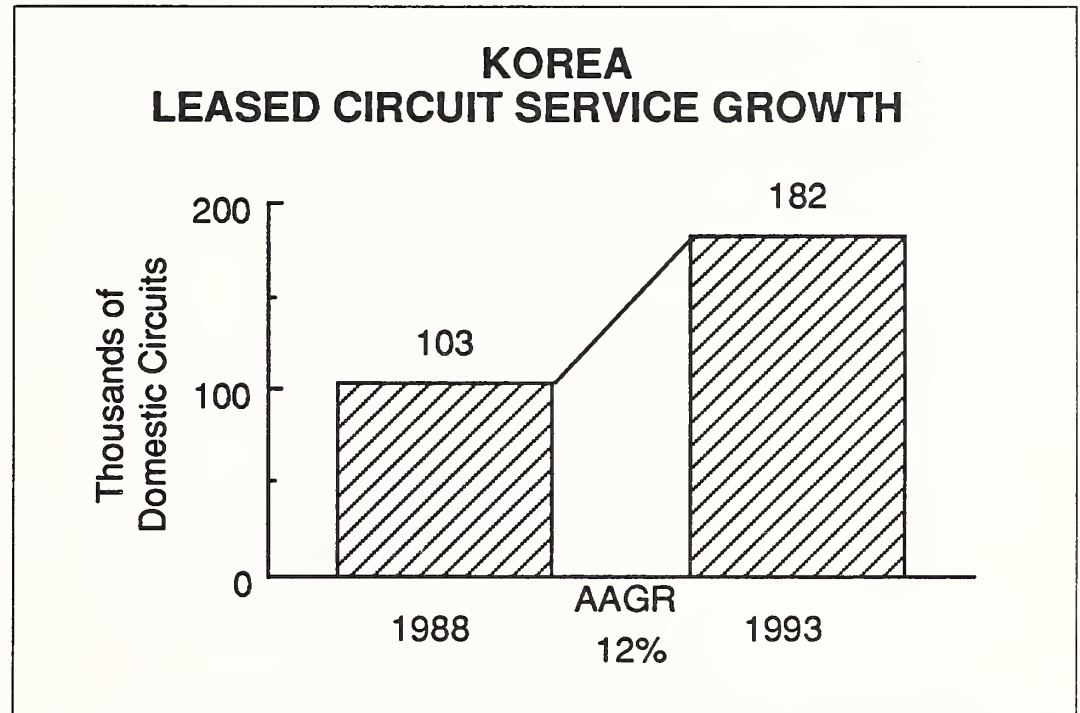
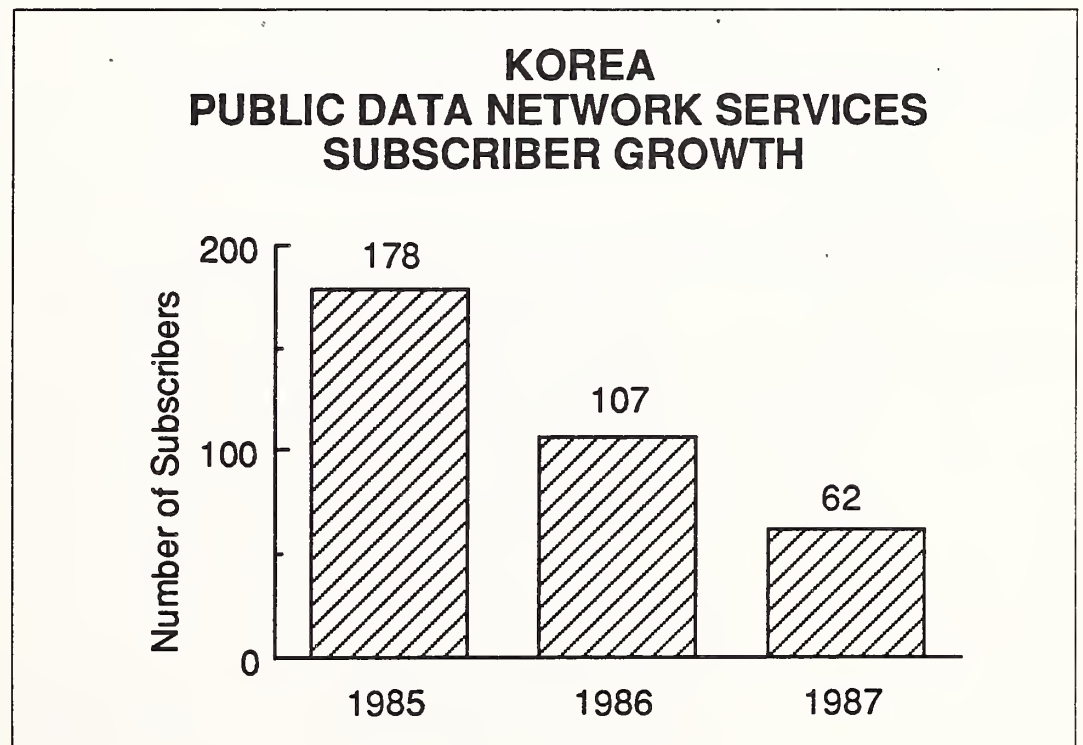
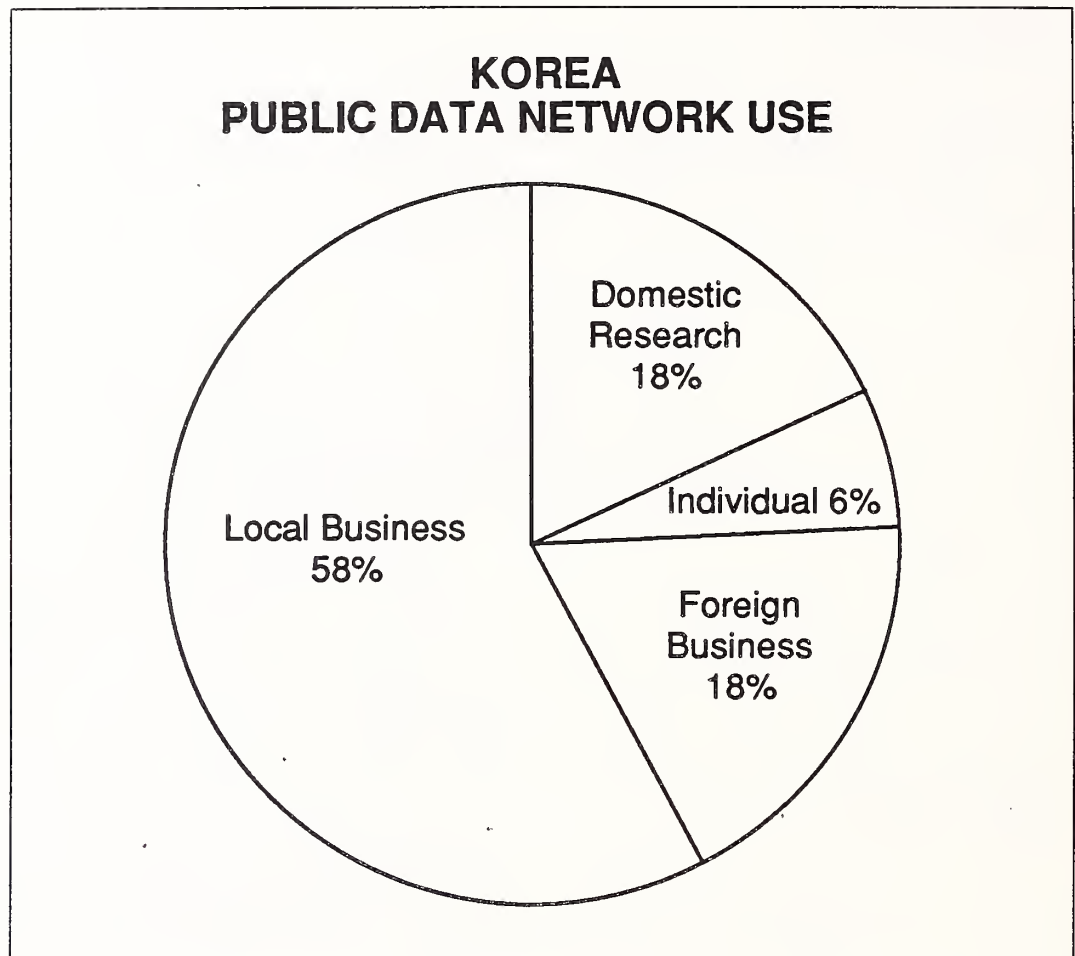


EXHIBIT VI-31



To date, the majority of the network services business has been derived from local business, with foreign business representing the second largest group. Together, they represent approximately 75% of the revenues. Use by individuals represents slightly less than 7% of the business. The remainder of the revenues are derived predominantly from domestic research organizations (Exhibit VI-32).

EXHIBIT VI-32



Over the next five years, DACOM and users expect domestic and international public data network services to grow significantly. DACOM estimates that the growth rate should be an estimated 150% per year for the next two to three years, slowing to an estimated 50% per year for the next several years. There are several reasons for the projections.

- CSC is expected to place increased emphasis on marketing its Notice electronic mail service. (CSC is the only authorized third-party provider of electronic mail services.)
- DACOM has developed H-MAIL (Hangul Electronic Mail), a system that provides electronic mail services supporting the Korean alphabet, which it expects to start marketing aggressively in 1989.
- DACOM has entered into an agreement with Dialcom to provide international electronic mail services.

DACOM indicates that it will place initial emphasis on the development of the domestic electronic mail market. This will be followed by expanded efforts to develop the international electronic mail market.

However, DACOM indicates that it expects the development of international services to be tied to the development of domestic services.

- DACOM is committed to the development of X.400 and the implementation of Message Handling Services. With a staff of more than 40 people dedicated to the implementation of X.400, DACOM is committed to ensuring the success of Message Handling Services.
- DACOM is committed to the development of services such as EDI. It believes that international EDI will be of significant value but has some concerns over premature release.

Overall, public data and value-added network services are believed by DACOM to be a fundamental building block for telecommunications services for many years to come.

#### **f. ISDN Services**

As in many countries of the world, ISDN is seen by local service providers as offering significant potential for the future. However, in South Korea, little specific development has taken place.

- DACOM indicates that general plans for the implementation are being considered by top management, but it does not have specific plans to implement ISDN-related services.
- KTA sees ISDN as a means to reduce the number of exchanges in the future and to maximize the use of facilities, but has no plans to implement specific ISDN-related services.
- DACOM indicates that Basic Rate ISDN services may become available within three to five years.
- KTA indicates that more than five years may be necessary for Basic Rate services to become available.
- Both DACOM and KTA indicate that Primary Rate Services will be available within the same time frame as Basic Rate Services. Both indicate that there is only marginal value in providing Basic Rate Services.

### **4. National Telecommunications Issues**

#### **a. Telecommunications Organizations**

Organized as separate entities in 1981 and 1982 respectively, the roles and responsibilities of DACOM and KTA are confusing to many international companies operating or planning to operate in South Korea.



At the time of establishment, KTA was wholly owned by the government and operated as a government monopoly. However, following the lead of telecommunications organizations in many countries, KTA has begun the process of privatization. Current plans provide for KTA to become a private company near the end of 1988. However, strong national influence and indirect control is expected to continue for some time.

Established as a private company, DACOM operates as an independent entity with a basic charter to develop and operate network-based (value-added) services.

As reflected by international businesses with telecommunications activities in South Korea, the actual degree of separation between KTA and DACOM is speculative at best. Though users report little pressure on the part of either DACOM or KTA to use public data networks as an alternative to leased circuit services, the fact that DACOM reviews and approves all requests for leased circuit services indicates that public data network services are a national priority.

#### **b. Regulatory Environment**

Regulatory issues in telecommunications are a significant factor contributing to the inability of international organizations to successfully meet their processing needs in Korea. Key issues include the following:

- Equipment importation is not permitted. Equipment to be used as part of a telecommunications network or connected to a network must generally be acquired from private suppliers in South Korea. Users report that attempts to openly bring equipment into the country have resulted in equipment seizure. A number of users indicate that smuggling is not uncommon.
- Tariffs and regulations are structured to favor the use of an increased number of lower-speed circuits rather than maximize the use of existing circuits. Users indicate that multiple 4.8 and 9.6 circuits are required even though the circuits are fully capable of supporting transmission rates at 19.2. Several users are able to demonstrate the success of higher speeds (some using illegal equipment) on 9.6 circuits.
- Resale of leased circuit services is not permitted for either domestic or international use. Sharing of leased circuit services is permitted, but only between groups of the same organization.
- Data protection is not currently an issue in South Korea. There are currently no specific laws or regulations related to privacy protection or transborder data flow. Neither DACOM nor KTA indicates any specific plans to implement policies or regulations related to these topics.



- Connection of a PABX to a leased circuit is currently not permitted. However, KTA indicates that the prohibition is related to incompatible standards and not to regulations prohibiting such a connection. KTA indicates that the connection of a PABX to a private leased circuit will be permitted with the introduction of ISDN.
- Discussions with KTA indicate that the encryption of data is permitted, but only with specific permission. However, KTA is reluctant to indicate conditions under which permission would be granted.
- Customers are not permitted to provide their own network management services. KTA must provide network management services, and any customer-required network management equipment must be placed on KTA premises.

## 5. User Needs and Requirements

User needs and requirements in Korea center around two key themes.

- Users believe that to meet their corporate needs, there must be greater flexibility on the part of local authorities in the use of telecommunications equipment, particularly modems, multiplexers, etc.
  - Users are generally concerned about the continued insistence on the use of local products.
  - One user characterized Korea as the Brazil of the Far East. Another indicated that Korea had overtaken Japan in its attitude toward the use of foreign equipment.
- Users are universally concerned with the division of responsibility between KTA and DACOM, particularly as it relates to leased circuit services. Users indicated that a less cumbersome approach is needed.

## G

### Malaysia

#### 1. Introduction

Influenced by a generally slow economy, the national telecommunications infrastructure has suffered since there have been a general lack of funds available for development.

Considered generally poor by users, the service environment is not expected to change significantly over the next several years. The one exception is the development of public data network services.

## 2. Economic and Political Setting

Malaysia is characterized by some as a society in transition, and recognition of the growing urbanization is placing strains on a society that has typically considered itself predominantly rural. Contributing to the strains are a growing number of factions that are seeking to gain a greater voice in government affairs.

A root cause for much of the strain and the growing number of factions is an imbalance between groups that hold the political power (Malaysians) and those that hold the majority of the economic power (Chinese).

The imbalance resulted, in 1969, in the implementation of the New Economic Plan, which stated that at least 30% of positions had to be filled by Malaysians. (Prior to the plan, the estimated 35% of the population that was Chinese held the majority of the economic power. The 55% of the population that was Malaysian held a minor part of the economic wealth.) The plan kindled an undercurrent of racial unrest that has yet to be resolved.

National elections in 1987 rekindled some of the social unrest as more than 100 'dissidents' were jailed for 'subversive activities' under a government law permitting 'detention without trial'. In addition, rulings that require Muslim prayers (the predominate religion) to be said each day, even in Chinese schools, sparked increased fears that the plan would be reinforced.

Overall, the socio-political environment in Malaysia is fragile. The government's policies to encourage greater participation by Malaysians in the economic infrastructure are progressing, but have met with less success than the government would like. At the same time, those holding the economic power have been resistant to give up much of what they have achieved.

The ultimate outcome remains to be seen, but some observers indicate that social unrest looms just below the surface and that only a small spark would be needed to set off major unrest.

Economically, Malaysia enjoyed a mild recovery in 1987 after two years of recession. The country achieved a 2% real growth rate in GDP, sparked predominantly by increased exports. However, underachievement of the manufacturing sector, with the exception of electronics, and the high reliance on government employment continues to be a drag on economic development.

Among the key problem areas are automobile and steel industries that have languished far behind expectation. An automobile assembly plant that was to be a cornerstone of new industrial development was able to

sell only 20,000 cars from a plant that was designed to build 120,000. Likewise, a steel facility built in conjunction with Nippon Steel Corp. was closed down for failing to meet performance specifications.

However, there are indications of a number of major changes in the industrial sector. The government is holding steadfastly to a policy of gradual withdrawal from direct participation in industry. In addition, the government is searching for ways to reduce the government's employment level, currently standing at 20%.

Although the future is generally considered to be tenuous, observers indicate that a number of the new directions could bode well for the future of the country's economy.

### **3. Telecommunications Services and Plans**

#### **a. Voice Services**

The overall infrastructure for voice services in Malaysia is weak, and dramatic changes are not expected to change in the near term.

Users in the primary commercial areas such as Kuala Lumpur and Penang report that local service is acceptable and that international service is generally acceptable. However, all note that national service is generally poor.

The infrastructure is analog and, though major work has begun to convert to digital networks, major changes will most likely not be seen for several years.

There are a number of changes either being made or planned that indicate the direction that STN is taking to improve the overall level of service in Malaysia.

- As of the end of 1988, IDD services have been expanded from 115 to 165 countries throughout the world. With this expansion, IDD service is now available to the majority of the countries of the world.
- STN has awarded contracts to upgrade the national system from analog to digital. Its current plan is to convert an estimated 80% of the national network to digital by 1992.
- STN has awarded a contract for the implementation of a nationwide customer service system. When implemented, the system will provide significantly expanded capability to monitor the progress of installations and repairs and permit an expanded capability to understand the installed base.



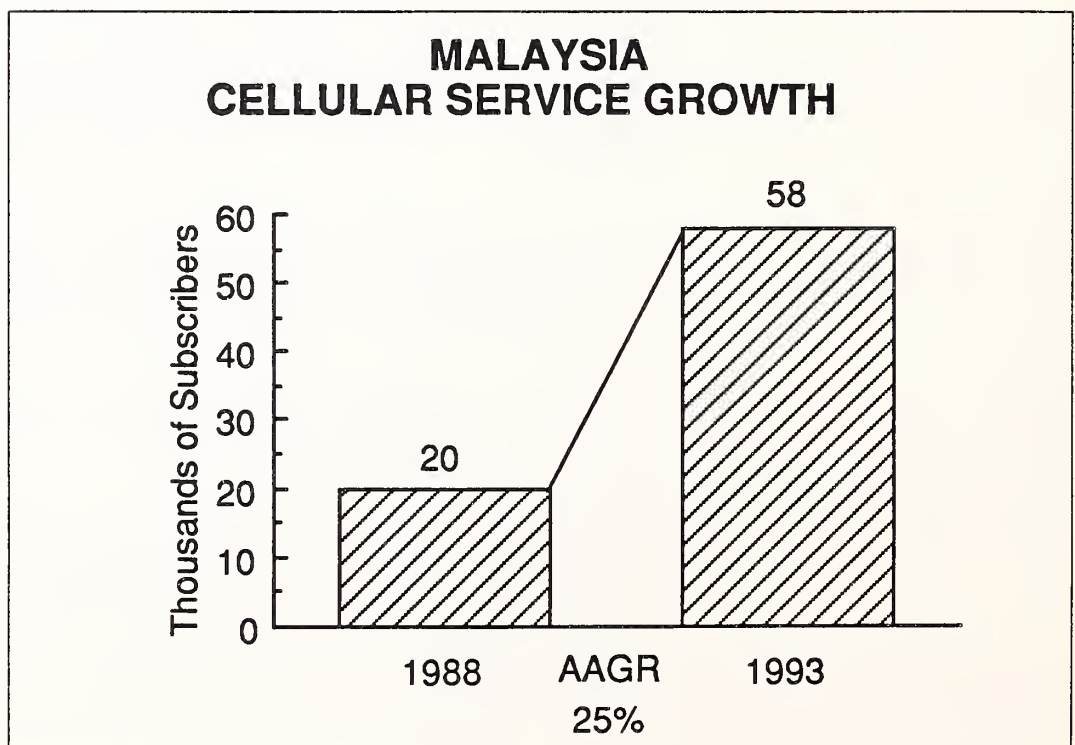
One area of development that has proven to be of commercial value for STN is its customer billing systems.

- STN does not actively promote its detail billing services in Malaysia and charges for the service. It currently charges M\$1.00 for each detailed residential bill and M\$2.00 for each detailed business bill. Its standard monthly bill is a summary only and is provided at no charge.
- STN currently has an agreement with Northern Telecom to market its detail billing system to carriers in other countries.

As in many countries in Asia, cellular service is growing rapidly. Since introduction of cellular service, growth has been steady and is expected to continue.

- STN estimates that the backlog of request for cellular service is approximately 20,000. They admit to difficulty in keeping up with the demand and are concerned that rapid approval of pending applications could overload the system.
- One of the key reasons for use of cellular services is the ability to bypass the existing network. Users indicate that they would like to see service become national in scope. STN does not consider this to be a high priority.
- STN estimates that the growth rate for cellular services is approximately 25% per year for at least the next several years (Exhibit VI-33).

EXHIBIT VI-33





## **b. Text Services**

Text services generally center around the use of telex and facsimile. Telex services are well developed and not expected to grow significantly.

- There are currently an estimated 12,000 telex units in Malaysia. The growth rate for the next several years is expected to not exceed approximately 2% per year.
- Facsimile services, which have begun to replace telex, are expected to grow at an annual rate of approximately 10% for the next several years.

The generally low level of growth in text services can be attributed to two primary reasons.

- The national network is not sufficiently well developed to be able to support sophisticated text services.
- The national economy is not growing at a rate that will stimulate the growth of text services.

## **c. Leased Circuit Services**

The development of leased circuit services have traditionally not been a high priority in the development of national resources. However STN indicates that this is beginning to change.

- STN has recently made a significant investment in the development of a Fiber Link between East and West Malaysia.
- STN has begun to make investments in the development of regionwide services to better integrate Malaysia with the rest of Southeast Asia. They are beginning to make investments in a number of fiber cables that will link Southeast Asia countries.

As an indication of increased focus on the development of leased circuit services, STN has recently begun the marketing of IBS services. While the lead time for service is currently estimated to be one year, this is expected to change over the next couple of years as the demand for service increases.

In addition, there are indications that the regulatory environment may be changing.

- STN indicates that user-defined (virtual) networks are a service that it believes is important. It indicates that while users need to obtain approval for the software used, the users will increasingly be able to define the structure of their own networks.

- STN indicates that, with the introduction of IBS services, the sharing of networks may be looked upon more favorably. It recognizes that users need to make maximum use of wideband circuits. Resale of the circuits will not be permitted.

#### d. Public Data/Value-Added Network Services

The development of public data/value-added network services is a high priority, as it is in many countries. STN indicates that it expects users to focus increasingly on value-added services over the next few years.

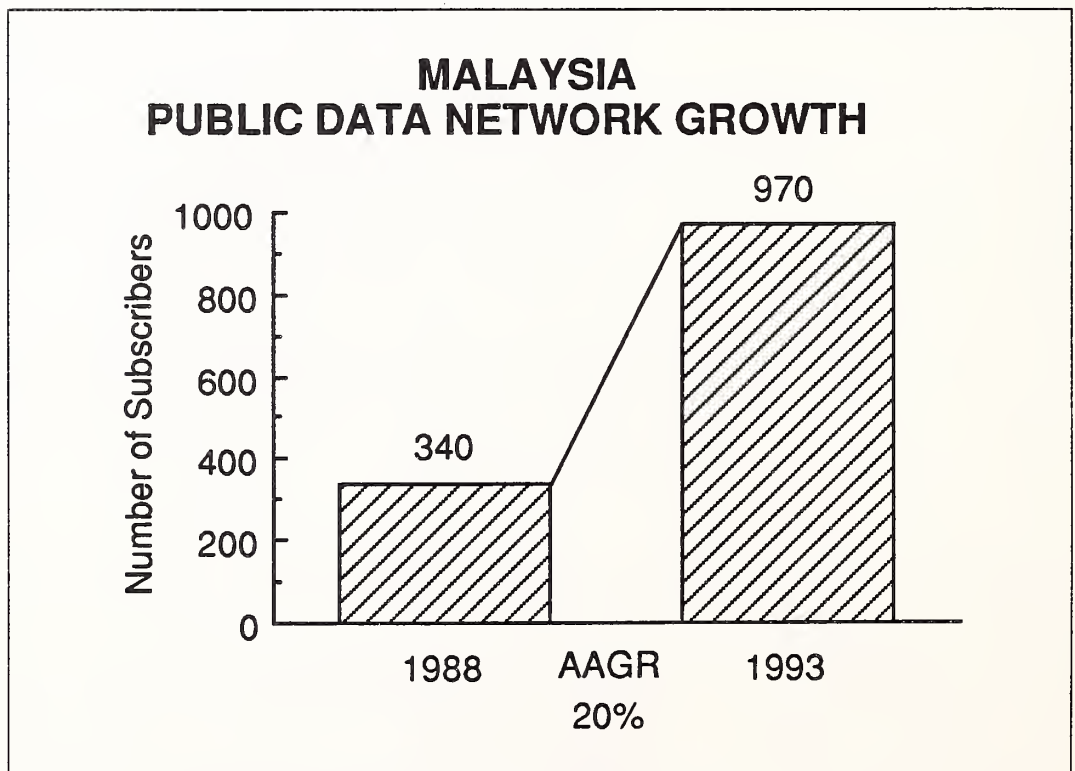
STN currently has service agreements with GTE and GEIS for the development and provision of international value-added services. STN plan to introduce a number of services in 1989.

- E-mail
- Circuit Switch
- '800' Service

As part of the '800' service, users will be able to access the national network through an 800 (WATS)-type of service.

Over the next several years, STN expects to triple the capacity of its national network. It expects the annual growth rate to be approximately 20% per year (Exhibit VI-34).

EXHIBIT VI-34



#### **e. ISDN Services**

ISDN services are not currently a high priority in Malaysia and are not expected to be for the next several years.

The national infrastructure will not currently support ISDN services, and STN indicates that it has not placed effort into identifying specific services that could be of user value.

#### **4. National Telecommunications Issues**

In Malaysia, as in many lesser developed countries, key national issues center around the allocation of national investments.

To date, the focus of national telecommunications investments have been the development of a national infrastructure. STN indicates this will continue to be the national priority.

Other national telecommunications issues center around the relationship of STN to foreign providers.

STN indicates that it is interested in developing relationships with foreign providers, but only with those that can provide products and services with greater value than the products/services of existing organizations.

STN believes that, in the next few years, increased emphasis will be placed on development, more services will become available, and increased emphasis will be placed on marketing of services.

#### **5. User Needs and Requirements**

User needs and requirements continue to center on the lack of a basic infrastructure. Three areas are most commonly noted.

- Users are dissatisfied with the overall quality of services.
- Users are dissatisfied with the generally long lead times necessary to obtain basic services, particularly leased circuits.
- Users are increasingly concerned with the lack of value-added services.

With one exception, user concerns are not expected to decline significantly over the next two to three years. The exception is in the number of value-added services.

- An increased number of value-added services are expected over the next two to three years.



- Users should expect to experience increased focus on the use of public data networks, as an alternative to leased circuits.

Overall, there will be few changes. However, users requiring lower speed data services will increasingly find their needs met through public network services, as this area receives increased emphasis.

## H

### New Zealand

#### 1. Introduction

If the changes that have taken place recently in New Zealand are an indication of the future, New Zealand could become one of the most liberal operating environments in the Pacific area.

Long a proponent of tight regulations, New Zealand has passed recent deregulation legislation that has resulted in a dramatic turn in the opposite direction. Whether this will continue is highly dependent on the economy of the country. However, the changes that have already taken place should have an impact that will be felt for years to come.

#### 2: Economic and Political Setting

New Zealand has long been considered a bastion of social security; however, a number of changes have taken place over the past few years that signal significant changes in the country's focus and direction.

A key indicator is the recent re-election of the Labour party, the first time that a labour government has been re-elected since 1946. With their re-election, the party has charted a course of emphasis on social responsibility and a return to 'fundamentals'.

Among the fundamentals that are being put in place is a shift in government entities to 'arm's length' corporations to permit a greater role by the private sector.

Among the changes that have already taken place is the establishment of the national bank (Bank of New Zealand), the national petroleum corporation, and the Post Office, which included domestic and international telecommunications, as government corporations.

As corporate structures, shares of the organizations have been sold to the public and are operated as independent businesses. Each corporation has an independent board of directors and the government operates as an oversight body, with participation on the boards.

The changes being proposed and implemented are not being met with complete enthusiasm by all factions of the government. The party rank and file is concerned about the true impact on the average worker. As a



consequence, the party has seen a need to demonstrate positive results quickly.

To date, the results have been generally positive, but with a generally depressed economy, the government has had to be satisfied with only modest gains in the short term.

The economy of New Zealand has been generally depressed since the mid 1970s, which saw the last price boom for economies based on pastoral and agricultural products.

Heavy emphasis on unprocessed and little-processed products have resulted on a national economic burden to support a heavily welfare-oriented country. As a result, the country has experienced a growing deficit and unemployment that has remained at 10% for the past four to five years.

While the initial signs are modest, changes in the government policies appear to be having a positive effect. Unemployment has been reduced to around 7% and is expected to be further reduced marginally in the near term.

Among the changes has been a reduction in the personal income tax and the implementation of a value-added tax, designed to shift tax burden to consumption. In addition, corporate tax rates have been increased to ensure that organizations assume a greater part of the national tax burden.

While the longer term results will not be known for several years, the key indicators suggest that the changes will contribute significantly to a revitalization of New Zealand's economy.

The changes are also having a positive impact on the telecommunications industry.

### **3. Telecommunications Services and Plans**

Until recently, the telecommunications service environment was generally characterized as being of reasonable quality but lacking in services of aggressive development. Generally, the industry has been like the country as a whole—sleepy and not interested in development. With the passing of the recent deregulation legislation, this has changed significantly.

#### **a. Voice Services**

Voice services in New Zealand have generally been considered of reasonably good quality, but the country has grown as far as possible on its own momentum. As a result, the growth in national voice services has

been only minimal over the past several years. This is not expected to change over the next several years.

However, the growth of international voice services has been significant, and the rate of growth is expected to continue for the next several years. From last year to this year, the rate of growth for international services has been 55%.

Telecom, the privatized replacement for the New Zealand Post Office, expects the rate of growth for international telephone services to be a minimal 3% to 5% per year.

However, Telecom anticipates that the use of facsimile will grow at a rate approaching 100% for the next several years, driving the overall volume of voice traffic considerably higher.

Cellular service is a temporarily bright spot in the area of voice services. Cellular service was introduced one year ago, and there are currently an estimated 2,500 customers and more on the waiting list.

However, Telecom estimates that the total market is no greater than 50,000 units, and that the market will be saturated within 8 to 10 years.

As part of their plans to develop the telecommunications environment, Telecoms is making a number of changes within the near future.

- It is planning on introducing an international '800' service. It expects the service to be available in 1989.
- The equipment market is opening. As of April 1989, the provision of equipment will become, essentially, totally deregulated.
- As of April 1989, the use of telephone equipment will become totally deregulated.

#### **b. Text Services**

Within New Zealand, telex has traditionally been a minor part of the service base. With the majority of the population concentrated in only two or three areas, there has been little need for a large national network, and international business has not played significantly in the national economy.

Telex services that have been in use are being replaced by facsimile service. Facsimile service is expected to grow at a rate estimated to be 100% per year for the next several years.

### **c. Leased Circuit Services**

Like text services, leased circuit services have traditionally been a small part of the service base. However, this could change over the next several years.

Telecom is currently participating in a number of international development projects that will significantly increase international capacity. Key projects include the following:

- Along with OTC (Australia), Telecom is a prime investor in the Tasman 2 fiber optic cable linking New Zealand and Australia.
- Along with a number of investors, Telecom is participating in the development of a fiber cable between New Zealand and Hawaii. With the implementation of this cable, New Zealand will have direct linkage with the U.S. Previously, most services had to run through Australia.
- Telecom is evaluating an agreement with Teleglobe (Canada) for the provisioning of a satellite that will serve New Zealand and Australia. This type of capability will significantly expand the communications capabilities between the two countries.

In addition to the developments taking place, deregulation will have a dramatic impact on the use of leased circuit services in New Zealand.

- As of April 1989, the use of leased circuits will be totally deregulated.
- With deregulation, organizations will be able to use leased circuits in any manner that suits them, including the unrestricted sharing of circuits.

Overall, growth of leased circuit services is expected to grow at an estimated 25% per year for the next several years.

At the present time, wideband services are important but not a high priority. There is currently too small an industrial base to warrant significant development of extensive wideband capability.

### **d. Public Data/Value-Added Network Services**

As in most countries in the region, public network services are key on the list of priorities of Telecom.

While promotion of the services has not been extensive in the past, Telecom expects to begin an aggressive marketing campaign in the second quarter of 1989.



Two areas that are key to the development of public network services are E-mail and transaction services.

- Telecom currently uses the Dialcom system and expects significant growth in E-mail services.
- There are currently projects underway to develop and test transaction-based services for the financial services community. Telecom believes that the financial services community should be a key user of public network services.

In addition to the services under development, Telecom plans to use public network services for Videotex and alarm and transport services.

An additional public network service that is currently being tested by a number of firms is EDI. While currently being used in a 'test' environment, Telecom expects EDI to be a key contributor to the development of network services in the years to come.

Telecom believes that X.400 will be a key standard for the development of public network services and plans implementation early in 1989.

Overall, public data/value-added network services are expected to grow at an estimated 25% to 30% per year.

#### **e. ISDN Services**

ISDN is considered important but is not high on the list of priorities for development.

- Telecom indicates that identifying specific services is difficult and will take time.
- Current plans provide for the introduction of ISDN services within approximately three years. However, this could slip if specific services are not identified.

#### **4. National Telecommunications Issues**

The key issue in New Zealand is the progress of privatization and deregulation. There has been some resistance on the part of the unions to become too privatized too quickly, but the process has progressed rapidly to date.

A 'fully open' market is projected by Telecom for the second quarter of 1989. The deregulation law comes into full effect in April 1989.



## 5. User Needs and Requirements

Users are enthusiastic about the progress of deregulation and believe that it will help stimulate the development of services and the country as a whole.

Their primary concerns are whether the process will continue. Most agree that time will be needed to see if progress continues or there is a reversal in the trend.

## I

### The Philippines

#### 1. Introduction

Among the countries in the Asia/Pacific area, the Philippines remains an enigma. As a result of U.S. development following WWII, the Philippines had one of the more comprehensive infrastructures in the region. However, following years of neglect, the quality of services is reported by users to be among the worst. Recent economic and political advances may begin to change this situation.

#### 2. Economic and Political Setting

From its discovery in 1521 to its independence in 1946, the Philippines have been ruled successively by the Spanish and the Americans. Following the establishment of an American-style constitution, national development progressed until the mid-1960s when communist insurgency prompted President Marcos to declare martial law in 1972.

Between 1972 and 1985, national development stagnated with little done to either develop or maintain the national (or telecommunications) infrastructure. With the installation of a new president in 1985, the beginning of an economic turnaround has been seen.

Economic turnaround has been particularly pronounced since the third quarter of 1986. Since then, the country has seen the stabilization of domestic prices, interest rates, and exchange rates. Recognizing the need to attract individuals and capital to the country, President Aquino began granting incentives to foreign investments in tourist-related projects and tourist establishments.

Also recognizing the importance of transportation and communications to the economic development, Aquino allocated significant additional public funds for development of this area of the economy (Exhibit VI-35). Of the national expenditures made for economic development, transportation and communications rated the highest funding of all sectors (Exhibits VI-36 and VI-37).

EXHIBIT VI-35

### PHILIPPINES NATIONAL EXPENDITURE CHANGES

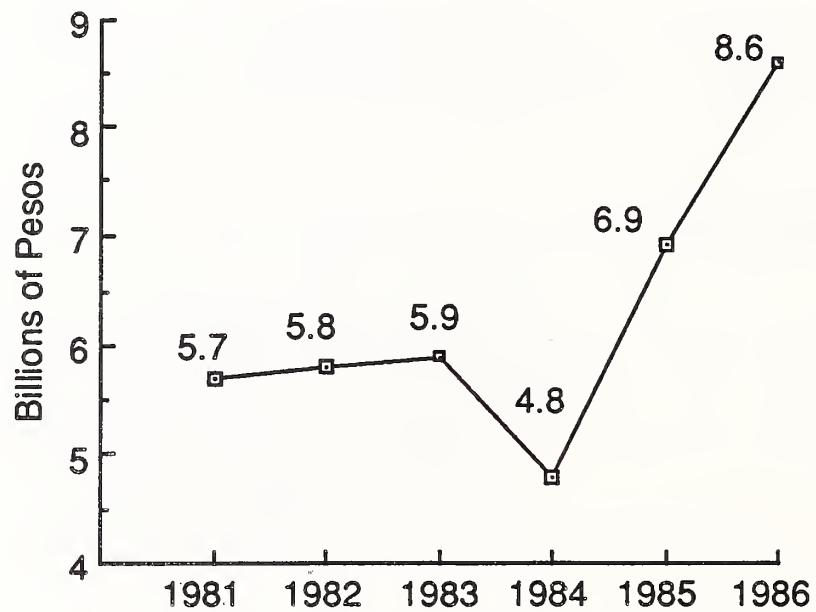


EXHIBIT VI-36

### PHILIPPINES NATIONAL EXPENDITURE BY TYPE, 1986

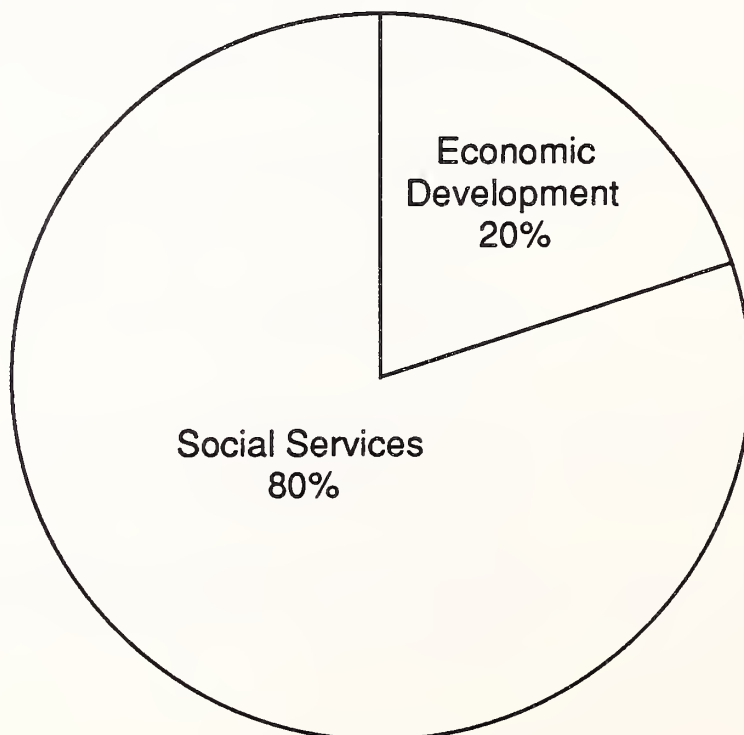
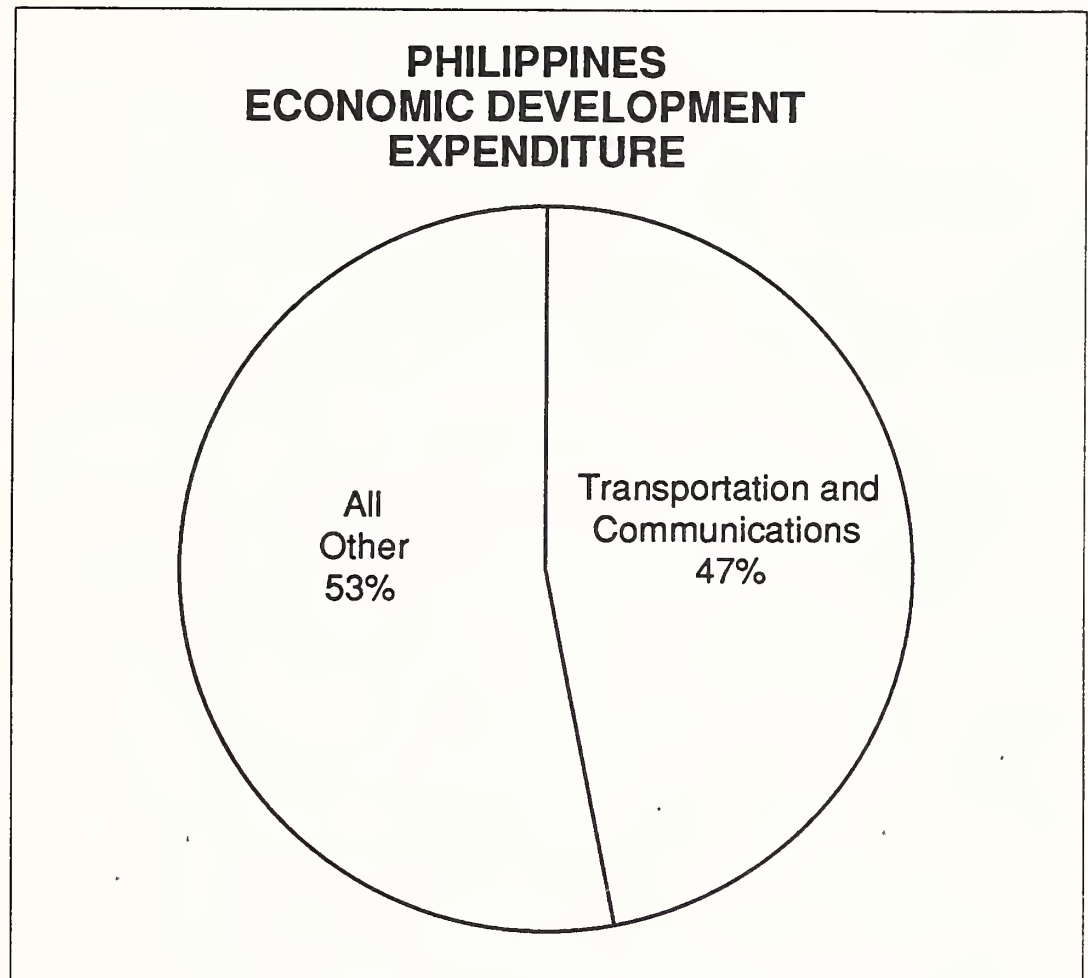


EXHIBIT VI-37



### 3. Telecommunications Services and Plans

#### a. Telecommunications Organizations

Dating from 1928, telecommunications services in the Philippines are now considered by users to be among the least satisfactory in the Asia/Pacific area. As indicated by a senior official of a major service provider, the basic national infrastructure is '30 years behind'. There are several reasons generally attributed to the 'inadequate' service capability.

- Political instability has caused a diversion of both national development funds and focus into areas that do not contribute to development.
- National priorities have generally focused on exploitation of natural (and agricultural) resources rather than development of an industrial base.
- Covering a geographical area that includes more than 7,000 islands, the Philippines have one of the most difficult areas in which to develop and maintain a national infrastructure.

Dominated by the Philippines Long Distance Telephone Company (PLDT), there are a number of domestic and international service providers. While PLDT is ranked among the top two or three largest corporations in the Philippines, there are a number of firms that compete for domestic and international services. Key service providers include the following (Exhibit VI-38):

## EXHIBIT VI-38

**PHILIPPINES  
KEY SERVICE PROVIDERS**

PLDT—Philippines Long Distance Telephone Company

Philcom—Philippines Global Communications

RCPI—Radio Communications of the Philippines

ETPI—Eastern Telecommunication Philippines

GMCR—Globe-McKay Cable and Radio

- Philippines Long Distance Telephone Company (PLDT)—Dating from 1928, PLDT has primary responsibility for providing national telephone service to the Philippines Islands. With its key subsidiary, the Philippines Telephone and Telegraph Company (PTT), PLDT currently holds an estimated 90% to 95% of the market for telephone services. PLDT is also responsible for providing national services for the Philippines government.

In addition to its own direct activities, PLDT holds the majority or significant shares in RCPI (Radio Communications Philippines Inc.) and Philcom (Philippines Global Communications).

- Philippines Global Communications (Philcom)—Sixty percent (60%) owned by PLDT, Philcom provides nearly all types of services, including domestic and international telephone, telex, and leased circuits. Among the services provided by Philcom are full communications services for national and international conferences held in the Philippines. Users note that the conferences are frequently government-sponsored.



- **Radio Communications of the Philippines (RCPI)**—A domestic and international provider, RCPI provides telex, leased circuit, radio broadcasting, and point-to-point radio telephone services.
- **Eastern Telecommunications Philippines (ETPI)**—ETPI is a major provider of international telecommunications services with direct ties to Cable and Wireless (H.K.). Holding approximately 50% of the international market, ETPI provides telex, leased circuit, data base access, and a variety of broadcast services to meet the needs of private and commercial users.
- **Globe-Mackay Cable and Radio (GMCR)**—Providing a range of services for the private and commercial users, GMCR provides an estimated 35% of the international facsimile, telex, and E-mail services and an estimated 50% of the international leased circuit services.

#### **b. Voice Services**

Telephone services in the Philippines are reported by users to be outdated and unreliable. A senior official with one of the major providers states that the infrastructure is thirty years out of date. However, with a stabilizing economy, there are indications that improvements in basic services may begin to change in the next five years.

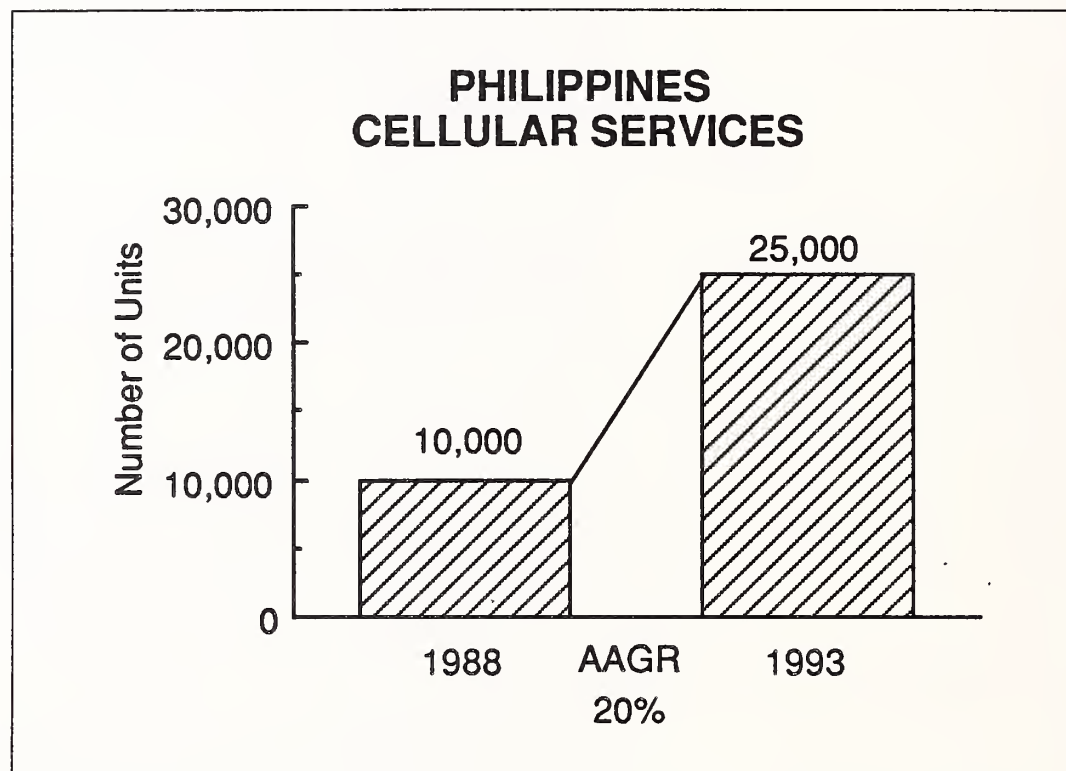
- As part of a comprehensive five-year development program (X-5), PLDT is committed to spending nearly U.S.\$300 million to provide additional basic services in major areas and to enhance the capability of Metro Manila with more than 70,000 digital lines.
- Recognizing the importance of quality telephone service, the government has asked PLDT to expand their investment in basic telephone services from the approximate U.S.\$300 million to more than U.S.\$1 billion.
- As part of a national plan to develop special Economic Development Zones, new infrastructures may be developed that are independent of the existing service base. The infrastructure of the zones could include standalone services that are based on satellite and VSAT services. While not integrated with the existing infrastructure, the new zones could provide a new base from which to build.

As in many countries in the Asia/Pacific area, cellular service is important to the development of the overall infrastructure. Key indicators include the following.

- As part of the initial planning, providers planned on approximately 300 applications for cellular service. When the service was announced, more than 3,000 applications were received.

- There are currently more than 10,000 applications pending, and fulfillment has progressed slowly due to the need to ensure sufficient service facilities. However, with the implementation of additional facilities, the demand is expected to be satisfied and growth is expected at approximately 20% per year for the next five years (Exhibit VI-39).

EXHIBIT VI-39



### c. Text Services

As in many of the Asia/Pacific countries, telex services are well established and little growth is expected in the future. Both users and providers project a steady decline in the demand for telex services as services such as E-mail and facsimile become more pronounced.

Telex services and equipment are provided only by the authorized carriers. Telex services include the provision of detailed call billing and the providers permit the encryption of data on a case-by-case basis. Telex refile is permitted.

Providers and users generally project a continuing decline in the volume of telex data at a rate of approximately 2% per year. Considering the projection, it is interesting to note that providers, such as GMCR, have been developing enhanced telex services. GMCR has developed Supertex, Telebox, and Ultima and the Compu-Telex service that provides an interface between computer systems such as the IBM System 34, 36 and 38. All these developments are intended to enhance the versatility of domestic and international telex services.

#### **d. Leased Circuit Services**

The development of leased circuit services are significantly hampered by the general inadequacy of the national infrastructure. However, organizations that have facilities in the Philippines indicate that leased circuit services (when available) are of generally good quality. Key considerations include the following:

- One multinational telecommunications service organization (user) indicates that, once installed, its leased circuit services are generally stable and that outages are frequently caused by unstable power rather than interruptions in the service itself.
- Providers indicate that emphasis is being placed on the development of high-capacity services such as IBS.
- Providers indicate that leased circuit services will grow at a rate of approximately 10% per year for the next five years.

#### **e. Public Data/Value-Added Network Services**

As in many countries, the development of public data (packet switch) network and value-added services are key to the development of national and international telecommunications services. Development considerations include the following:

- The key focus for network development is electronic mail. Significant effort is being placed on the development of PC-based applications to ensure that the PC becomes the key component of integration between the user and domestic and international networks.
- Service arrangements currently exist with a number of international providers, including WUI and ATT for the provision of international E-mail services. Additional relationships are being considered and agreements will be established with organizations that can provide significant added benefit.
- Providers consider X.400 important to the development of domestic and international services and have a keen interest in PC-based X.400 capabilities. At the present time, E-mail is the only major service being developed.
- Packet switch and value-added services are currently projected to grow at a nominal rate of 5% to 8%. However, providers note that little has been done to promote the services to date. They indicate that the growth rate will be closer to 20% if the services are promoted. They are expected to begin promoting the services within the next 12 to 18 months.



#### **f. ISDN Services**

ISDN is considered to be important to the development of domestic and international telecommunications services. However, there are a number of considerations pertaining to the development of ISDN services.

- Providers indicate that Basic Rate services will not be available for at least five years. They generally agree that Primary Rate services will be available on a limited basis at the same time that Basic Rate services are introduced.
- ISDN is considered an avenue to integration of voice and data services. However, providers were generally unable to identify specific services that would result from the implementation of ISDN capabilities.
- VSAT services are considered of greater importance than ISDN.
- Key providers were generally unable to identify any specific ISDN-based services that will be available at the time ISDN is implemented. Integration capability is the primary reason identified for implementing ISDN.

#### **g. Other Services**

Satellite services are considered to be extremely important to the development of telecommunications in the Philippines. Considerations include the following:

- VSAT services are being considered as the primary method of linking Economic Development Zones to both domestic and international services. Using VSAT, organizations located in the Zones will have the ability to connect directly to international services, bypassing the national infrastructure.
- Direct Broadcast Satellite services utilizing VSAT are considered important to the development of educational and communications services to many of the less-accessible islands.
- Satellite services are seen as the key element for the introduction wideband analog and digital services throughout the country.

### **4. National Telecommunications Issues**

The Philippines face a number of issues over the coming years. A key issue is the number of organizations that provide services.

- To date, users indicate that the number of organizations competing to provide a limited number of services is causing a fragmentation of resources, resulting in a less than adequate level of service.



- Recently, questions have begun to emerge regarding whether the government should, in an effort to ensure higher quality of services, limit the number of organizations providing service. While no changes are expected within the near term, the number of organizations is expected to continue to cause problems.

In addition to issues relating to the number and structure of service providers, there are a number of other issues facing the Philippines over the next several years.

- Unlike a number of other countries that are beginning to consider changes to their basic policies, the Philippines is expected to continue their policy of limiting leased circuit services to a single organization. However, it should be noted that circuits can be shared with organizational entities in which a company has as little as a 5% interest.
- Standards will continue to be directly in line with CCITT standards. International standards and guidelines are used as the primary guideline to ensure compatibility.
- Currently, there are few restrictions on the amount or type of data transmitted within the country or internationally. Providers indicate that neither data nor privacy protection regulations are of significant importance in their policies. Users do not indicate any significant changes in the existing regulations.
- Issues relating to international trade policies do not appear to be significant issues in the Philippines. Currently, the country is most interested in policies that will promote the development and use of telecommunications, and there is little indication of policies that could inhibit the expansion of services.

## 5. User Needs and Requirements

As in other countries in Asia/Pacific, users' primary requirements are for an infrastructure that provides reliable, basic services.

The Philippines is slow to change, but if the economic and political environment continue to stabilize, the possibility for growth is evident.

However, lacking stability and some investment, over the next several years the prospect for significant growth is questionable.

**J****Singapore****1. Introduction**

With a high degree of political stability and one of the more impressive technical infrastructures in the Far East, Singapore is frequently considered an alternative to Hong Kong as a telecommunications center.

Generally noted for good quality communications, the country has taken a number of recent steps that could improve the overall environment and place the local authority in direct competition with other major providers.

**2. Economic and Political Setting**

Although the Republic of Singapore is noted for order and cleanliness, the political environment could begin to change over the next several years.

With the basic requirements of 'nation building' behind them and more than 80% of the citizens owning their own homes, many of the younger generation are chaffing at the bit to realize the fruits of their labor.

However, staunchly anti-communist Prime Minister Lee Kuan Yew has been reluctant to allow more than very gradual increases in authority to elected representatives. The recent use of a law that permits 'detention without trial' on 22 legal and business professionals espousing a Marxist plot to subvert the government can only slow the process. Recent circulation restrictions for the Asian Wall Street Journal further indicate the government's need to maintain a tight central control.

While Mr. Lee has been searching for ways to begin the power transition, most observers believe that the transition could be slow. Some have concern that the transition may cause some disruption in the political and economic process.

Economically, the picture has brightened considerably in the past year. Suffering from a recession that lasted a short four quarters, the country is expected to register growth of more than 7% this year.

Key indicators of the growth include the growth of the manufacturing sector by 32% in the first half of the year (1987) and the increase in corporate earnings by 25% over the previous year.

Telecommunication products are a growing contributor to export revenues. As of 1987, telecommunications apparatus ranked third in the categories of commodity exports, behind petroleum and crude rubber. However, this could change over the next several years.

Between 1982 and 1986, the value of petroleum product exports declined by 28% and crude rubber products declined 23%. During the same period, the export of telecommunications apparatus increased by 47%. The trend is expected to continue, with manufacturing-related products comprising a greater percentage of the exports.

However, even the economy is not without its problems. Two key areas of difficulty are the construction industry and the availability of qualified manpower. Over the past year, the construction industry has contracted by nearly 20% and private sector construction starts are nearly nil. Construction is generally being supported by public sector requirements.

Qualified manpower remains a problem. While the government has placed strong emphasis on education, less than half the population have secondary education degrees. With increased focus on the development of technology-based industry, a highly qualified population is necessary to ensure continued growth.

### **3. Telecommunications Services and Plans**

With a comparatively small industrial and population base, Singapore is faced with an increasingly difficult problem. Over the past 25 years, the major focus of the Telecommunications Authority of Singapore (TAS) has been on the development of a national infrastructure. That is beginning to change.

Senior officials at TAS realize that they are rapidly approaching a point where they can no longer depend on national development as the source for their growth. They recognize that the domestic market for basic services is nearing saturation.

As a result, as time progresses, they will need to place increased emphasis on incremental (value-added) services and begin to look beyond the borders for sources of business.

#### **a. Voice Services**

Telephone services in Singapore are well developed. The country has a density of 42.9 telephones per 100 population, one of the highest ratios in the world.

National services have not grown rapidly over the past few years. However, international services have grown steadily. TAS indicates that the growth of international telephone services was 40% between 1986 and 1987.

The primary driving force for the growth of the services has been the growing use of facsimile, which accounted for the majority of the 40% increase in services.



Cellular service has also grown steadily. With the initial demand satisfied, the rate of growth is projected to be approximately 10% to 15% per year for the next several years.

#### **b. Text Services**

Telex services are well developed and the market is believed to be generally saturated. The growth rate for the past year was estimated to be only 1.9%.

As in many countries, the volume of telex is expected to decline over the next several years as facsimile becomes increasingly important. Telex volume is expected to decline by at least 40% over the next five years.

Facsimile is expected to continue to grow. For the year between 1986 and 1987, growth was an estimated 84%. TAS projects that facsimile use will continue to grow at an annual rate of approximately 20%.

#### **c. Leased Circuit Services**

Leased circuit services, also well developed, are being driven by international demand. However, this could change temporarily as new national services become available.

Currently, growth is driven by international demand. For the past year, the growth of national services was an estimated 5.3%. The growth of international services was an estimated 20.6%. The growth of international services is expected to continue to grow at an estimated 20% per year.

One development that could increase domestic demand in the short term is the introduction of domestic wideband (ISDN) services.

In November 1988, TAS introduced a national digital network that will provide circuits at speeds 2-8Mbps. The digital network results from the completion of a recent upgrade to the national network.

Overall, the digital network may increase domestic demand in the short term and while it should contribute to higher quality services, it is not expected to have significant impact on the overall service base.

#### **d. Public Data/Value-Added Network Services**

Public network services in Singapore have not received significant attention. As a result, growth has been somewhat nominal. TAS indicates that this is expected to change.



Over the past year, TAS's TELPAC (remote data base access) service has grown in number of connections at a rate of approximately 15%.

During the same period, TAS's Datel service (dial access, packet network) grew at an estimated 38%. While the service does provide higher speeds, TAS has only promoted speeds up to 1200bps for users that do not have sufficient volume for leased circuits.

TAS expects the situation to change over the next several years. It indicates that it expects significant growth in the use of public networks for services such as E-mail (Dialcom) and EDI.

TAS is not able to predict growth in value-added services, since these are provided by commercial vendors.

#### **e. ISDN Services**

As in many countries, ISDN in Singapore remains an enigma. TAS believes that there is potential for new services but is not able to identify any marketable services. Its key focus is to provide the basic capacity (2-8Mbps) and wait for users to identify services that are needed.

### **4. National Telecommunications Issues**

The key issue facing TAS is the establishment of new directions, recognizing that the national market is becoming saturated.

To address the situation, TAS recently established a separate subsidiary to participate in international development projects. It plans to utilize its well-educated staff as a resource base to compete for development projects in countries throughout the world.

### **5. User Needs and Requirements**

Key user issues in Singapore have changed little over the past several years. While there are few complaints over the quality of service, users continue to voice concerns over what they believe to be high cost of service and a general inflexibility in TAS's policies and procedures.

Policies may liberalize over the next few years as TAS increasingly acknowledges the need to be user-responsive to increase the use of the installed base. However, any changes will be slow in coming.

**K****Thailand****1. Introduction**

A country with limited industrial base and highly underdeveloped telecommunications infrastructure, Thailand is faced with the prospect of a continual decline in overall capability unless steps are taken to correct a difficult situation.

Of particular importance is the apparent lack of development by the Telecommunications Authority of Thailand (TOT), which has responsibility for national telephone services and consequently, the basic infrastructure.

Characterized as inefficient and bureaucratic, the TOT has made little progress over the past few years towards developing an installed base. There have been continuous delays in development plans, with five-year plans going relatively unaccomplished.

Whether and when this will change is open to question. There are indications that the government is becoming increasingly dissatisfied with the TOT's performance. A change could provide needed stimulus.

**2. Economic and Political Setting**

Strongly dominated by the military, the government of Thailand is one of the few countries in Asia that has not been under colonial rule.

Generally stable, the government leadership has been considering constitutional amendments that would separate the powers of the legislative and executive branches, intending that elected Ministers would have sole responsibility for enacting laws. An additional purpose of the change would be to set the stage for direct election of the Prime Minister.

However, undertones of dissent in the government and among the military suggest that these changes will not come about quickly. The military is becoming more restive and wants to have a more active role in the government process.

While the country's government is expected to remain relatively stable, observers suggest that 'true' democracy will not arrive on the scene for several years to come—if at all. While the government has been able to withstand military-initiated coup attempts in 1981 and 1985, there are indications that additional attempts could be forthcoming. The government is not expected to loosen the controls until it can be certain that actions will not be overturned by a zealous military.

Economically, the country has fared well, registering a real growth rate of 5% to 7% in 1986. According to the International Monetary Fund (IMF), this level of growth can be expected to continue through 1991.

Key contributors to the economic turnaround were the decline in oil prices (Thailand is an importer of oil) and the informal tie of the Baht to the U.S. dollar. With the revaluation of the U.S. dollar, exports have soared, helped by increased demand of the international market.

With the turnaround, some economists have considered placing Thailand on the list of Newly Industrialized Countries (NIC). However, most economists believe that Thailand's economy is still too overly based on agricultural products to be considered industrialized.

Currently, manufacturing accounts for only 20% of the GDP. However, this could change by the early 1990s. There is emphasis on the development of light industry to form a base for growth, and Thailand's factories are running at full capacity and have been unable to keep up with demand.

With the improved economic position, the government has projected an increase of approximately 7.6% in domestic spending for the 1988 fiscal year, much of the increase targeted at the further development of national infrastructure.

### **3. Telecommunications Services and Plans**

#### **a. Voice Services**

Voice services in Thailand are characterized by users in Thailand as poor, at best. Services are available to only a limited portion of the population and then only in the major cities. The installed base provides service to an estimated 1.9 persons per thousand.

There are a number of plans currently underway that could begin to improve overall service.

- A contract has been tendered to upgrade major switching centers with digital switches over the next several years.
- A contract has been tendered for the design (and subsequent development) of a national network based on fiber optics and digital microwave.
- With these projects in mind, it is important to note that current published plans provide for the installation of only an additional 1,000 circuits by 1992, a minimum number considering the demand that exists.



Growth over the next five years is projected to be an estimated 30% per year. While the percentage is reasonable high, the comparatively small base that this applies to must be recognized.

Overall, not much change is expected over the next two to three years. If the network upgrade does become a reality, major improvements might begin to emerge.

#### **b. Text Services**

As in many countries, telex service is declining. While it remains as a stable service and is the only available service in a large portion of the country, service is projected to decline at an estimated 2% to 3% per year.

The use of facsimile is currently not monitored, and the installed base is believed to be small. However, facsimile is beginning to grow and is projected to grow at an estimated rate of 50% per year.

#### **c. Leased Circuit Services**

The service base for leased circuits is very small. One estimate indicate that there may not be more than 150 leased circuits.

There is currently no digital service in Thailand; however, this is expected to change by 1990. The Communications Authority of Thailand (CAT) indicates that it plans on providing a 2Mbps digital service for international users within the coming two years.

Overall, leased circuit services are projected to grow at an estimated 20% to 30% for the next several years.

#### **d. Public Data/Value-Added Network Services**

There is currently no national public data network in Thailand and there has been only limited planning for a national network. International services are provided through Telenet and Tymnet nodes.

Plans to develop a national network are progressing slowly. Providers indicate that their first priority will be to develop a packet switch network.

Value-added services are generally not currently considered to be of high priority. Discussions indicate that a packet network may be viewed as a means to develop a national service base.



Among the value-added services that are considered, providers indicate that only facsimile store and forward is of significant interest. They do currently have cooperative arrangements with GEIS and Infonet for international E-mail services and do not foresee the need for additional relationships.

X.400 is not considered a high priority. The providers do not consider this standard important to the development of a national network.

#### **e. ISDN Services**

Considering the overall lack of an installed base and the general lack of development that has taken place, ISDN is, not surprisingly, a low priority. The providers generally consider planning horizon to be eight to ten years.

### **4. National Telecommunications Issues**

Key issues in Thailand center around the lack of a national infrastructure and the general lack of results in meeting plans and projections.

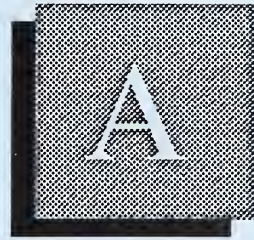
To date, while CAT has been reasonably successful at building a service base, the TOT has been generally unsuccessful. Questions have been raised recently regarding whether some direct changes should be made; however, none are anticipated in the short term.

### **5. User Needs and Requirements**

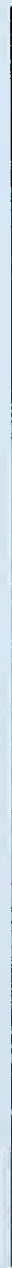
User needs and concerns have centered around the general lack of facilities and services. This is not expected to change over the next several years.

In general, a number of users in Thailand express a feeling of resignation. They have received neither promises nor service and have adapted to the environment.



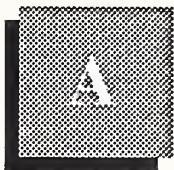


# Appendix: User Survey Document









## Appendix: User Survey Document

### A. Background Information

A.1 In which of these countries does your company have an office? (Check all that apply)

a\_\_\_ Australia b\_\_\_ Japan c\_\_\_ South Korea d\_\_\_ Hong Kong  
e\_\_\_ China(PRC) f\_\_\_ Philippines g\_\_\_ Malaysia h\_\_\_ Singapore  
j\_\_\_ Indonesia k\_\_\_ Thailand.

A.2 On a scale of 1-5 (5 being highest); How critical are your international telecommunications to the success of your business. \_\_\_\_\_

A.3 Regarding your international telecommunications services, which of the following is of greater importance to your organization? (One Response Only)

a\_\_\_ Cost Savings and Productivity  
b\_\_\_ Revenue Growth and Strategic Expansion

### B. Decision Making Process

B.1 When considering decisions to implement, change or expand telecommunications services in a country; is the planning and *operational decision* generally made by staff located:

a\_\_\_ In That Country  
b\_\_\_ At A Regional Office  
c\_\_\_ At A Headquarters Office

B.2 When planning or expanding services in a country or entering a new country, does your company most frequently make decisions based on information about services and costs obtained from:

- a\_\_\_ A carrier located in the country of your headquarters office?  
 b\_\_\_ A carrier that regularly conducts business in that country?  
 c\_\_\_ A third party such as an independent consultant?  
 d\_\_\_ Personal visit to the provider (PTT) in the country?

### C. Deregulation/Political Assessment

C.1 Please rate on a scale of 1-5 (5 being highest), your assessment of the degree of telecommunications deregulation in the following countries?

- a\_\_\_ Australia b\_\_\_ Japan c\_\_\_ South Korea d\_\_\_ Hong Kong  
 e\_\_\_ China(PRC) f\_\_\_ Philippines g\_\_\_ Malaysia h\_\_\_ Singapore  
 j\_\_\_ Indonesia k\_\_\_ Thailand.

C.2 Considering the planned changes in the governing structure in Hong Kong in 1997; are the changes important in your planning considerations? \_\_\_\_ Yes \_\_\_\_ No. Why?

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### D. Services and Regulations

D.1 For each of the following countries, please rate on a scale of 1-5 (5 being highest), your assessment of the overall quality of telecommunications services.

- a\_\_\_ Australia b\_\_\_ Japan c\_\_\_ South Korea d\_\_\_ Hong Kong  
 e\_\_\_ China(PRC) f\_\_\_ Philippines g\_\_\_ Malaysia h\_\_\_ Singapore  
 j\_\_\_ Indonesia k\_\_\_ Thailand.

D.2 Of the same countries, please identify those in which you use a public data (packet switch) network for *domestic* services?

- a\_\_\_ Australia b\_\_\_ Japan c\_\_\_ South Korea d\_\_\_ Hong Kong  
 e\_\_\_ China(PRC) f\_\_\_ Philippines g\_\_\_ Malaysia h\_\_\_ Singapore  
 j\_\_\_ Indonesia k\_\_\_ Thailand.

D.3 Of the same countries, please identify those in which you use a public data (packet switch) network for *international* services?

- a\_\_\_ Australia b\_\_\_ Japan c\_\_\_ South Korea d\_\_\_ Hong Kong  
 e\_\_\_ China(PRC) f\_\_\_ Philippines g\_\_\_ Malaysia h\_\_\_ Singapore  
 j\_\_\_ Indonesia k\_\_\_ Thailand.

D.4 Please rate on a scale of 1-5 (5 being highest), your interest in using a value added or packet network for the following reasons.

- a\_\_\_ Alternative to leased circuits
- b\_\_\_ Access to corporate network/database
- c\_\_\_ Access to public database
- d\_\_\_ Specific applications (ie E-Mail, EDI, store-and-forward)

D.5 On the same scale of 1-5 (5 being highest), please rate the following reasons for selecting a value added network service provider.

- a\_\_\_ Cost
- b\_\_\_ Variety of Services Provided
- c\_\_\_ Geographic Coverage
- d\_\_\_ Service Quality
- e\_\_\_ Other (Please specify) \_\_\_\_\_

D.6 Please identify three VAN applications or enhancements to applications that you would like to have that are not available today. For each application identified, please rate on a scale of 1-5, the importance of the application.

Application/Enhancement	Rating
a. _____	a. 1. _____
b. _____	b. 1. _____
c. _____	c. 1. _____

D.7 Please estimate the total number of leased circuits currently installed in the Asia/Pacific area (Consider all speeds). \_\_\_\_\_

D.8 Of the total number of circuits, please estimate the percent that are:

- a. \_\_\_\_\_ % AVD (Alternate Voice Data)
- b. \_\_\_\_\_ % Telex Grade (Less than AVD)
- c. \_\_\_\_\_ % Wideband (50Kb or higher)

D.9 Considering the leased circuits that you have installed; is the primary use:

- a. \_\_\_\_\_ Data Only
- b. \_\_\_\_\_ Voice Only
- c. \_\_\_\_\_ Data and Voice
- d. \_\_\_\_\_ Multiple Applications

D.10 Please estimate the total number of leased circuits that you expect to have within five years. \_\_\_\_\_

D.11 Of the total number of circuits that you expect to have five years from now, please estimate the percent that will be:

- a\_\_\_\_% AVD (Alternate Voice Data)  
 b\_\_\_\_% Telex Grade (Less than AVD)  
 c\_\_\_\_% Wideband (50Kb or higher)

D.12 Is the operation of your leased circuit service managed by:

- a\_\_\_\_ Headquarters Staff  
 b\_\_\_\_ Regional Staff  
 c\_\_\_\_ In-Country Staff  
 d\_\_\_\_ Service Provider

D.13 Assuming acceptable costs, would you consider having implementation, coordination and ongoing operation of your Asia/Pacific network managed by a third party? \_\_\_\_ Yes \_\_\_\_ No Why?

D.14 On a scale of 1-5 (5 begin highest) how would you rate the degree of pressure being exerted by the PTT's to use public networks as an alternative to private circuits. \_\_\_\_

D.15 Do you think that the PTT's will increase their efforts to require use of public data networks as an alternative to private networks? \_\_\_\_ Yes \_\_\_\_ No. Why?

## E. Telecommunications Budget

E.1 Regarding your service costs; can you tell me (or estimate) your total (corporate) telecommunications budget. \$\_\_\_\_\_

E.2 Of the total telecommunications cost, can you tell me (or estimate) how much is for personnel costs? \$\_\_\_\_\_

E.3 What percent of the total telecommunications budget is for international services? \_\_\_\_\_% (Estimate if specific figure not available)

E.4 Of your total *international* telecommunications cost, what percent is for personnel? \_\_\_\_\_%

E.5 What percent of your international traffic is voice and what percent is data? \_\_\_\_% Voice \_\_\_\_% Data



E.6 Of the total data network cost, what % is for the following types of services?

- a \_\_\_\_\_ % Leased Circuits  
 b \_\_\_\_\_ % Public Network (alternative to leased circuits)  
 c \_\_\_\_\_ % Value Added Network Services

E.7 What percent of your international traffic will be voice and what percent will be data five years from now. \_\_\_\_\_ % Voice \_\_\_\_\_ % Data

E.8 What percent of total is for services to or within the Asia/Pacific area? \_\_\_\_\_ %

E.9 Can you estimate the percent increase (or decrease) in expenditures for telecommunications services to Asia/Pacific between last year and this year? \_\_\_\_\_ % Inc \_\_\_\_\_ % Dec  
 \_\_\_\_\_ Same

E.10 Considering the following categories, can you estimate the percent increase (or decrease) in your company's expenditures in the *next five years* in the Asia/Pacific area:

		% Inc	% Dec	Same
Telephone		_____	_____	_____
Telex		_____	_____	_____
Fax		_____	_____	_____
Public Network (Data Transport)	_____	_____	_____	_____
Value Added Network Services	_____	_____	_____	_____
Leased Circuit (AVD Grade)	_____	_____	_____	_____
Leased Circuit (Telex Grade)	_____	_____	_____	_____
IBS (Intelsat Business Svc)	_____	_____	_____	_____
Other		_____	_____	_____

## F. Future Considerations/Directions/Issues

F.1 On a scale of 1-5 (5 being highest), please estimate how high you believe the probability is of the administrations adopting 'volume sensitive pricing' in the Asia/Pacific area \_\_\_\_  
 Why?

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F.2 In your opinion, will growth in the number of fiber optic cables result in a reduction in tariffs? \_\_\_\_\_ Yes \_\_\_\_\_ No. Why?

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F.3 Is ISDN a factor in your considerations for implementing or expanding your services in the Asia/Pacific area? \_\_\_\_\_ Yes \_\_\_\_\_ No (If no, skip to question F.5)

F.4 In what way do you expect ISDN to impact telecommunications services in the Asia/Pacific area?

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F.5 On a scale of 1-5 (5 being highest), please rate how restrictive *tariffs* are in the Asia/Pacific area. \_\_\_\_\_. Why?

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F.6 On a scale of 1-5 (5 being highest), please rate how restrictive *network* standards (X.75, OSI, etc.) are in the Asia/Pacific area. \_\_\_\_\_ Why?

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F.7 On a scale of 1-5 (5 being highest), please rate how restrictive *application* standards (X.12, Edifact, etc.) are in the Asia/Pacific area. \_\_\_\_ Why?

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F.8 On a scale of 1-5 (5 being highest), please rate how restrictive PTT *policies* are in the Asia/Pacific area. \_\_\_\_ Why?

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F.9 Please identify the most significant problems in expanding your telecommunications services in the Far East. (Consider factors such as service availability, lead times, costs, regulations, standards, etc.)

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F.10 Considering the services that are generally available in most countries (telephone, telex, leased circuits, value added and packet networks); are there *enhancements* to these services that would improve your ability to accomplish your company's objectives. Please describe.

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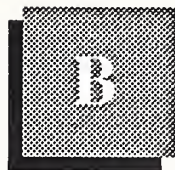






## Appendix: Provider Survey Outline





## Appendix: Provider Survey Outline

### A. General Information

A.1 Could you briefly describe the organization of \_\_\_\_\_ (or provide an organization chart)

### B. Services and Regulations

Telephone

B.1 Do you provide international direct dialing? \_\_\_\_ Yes \_\_\_\_ No

B.2 Do you permit international credit card calling from \_\_\_\_\_ to other countries?  
\_\_\_\_ Yes \_\_\_\_ No. If no, why?

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B.3 Do you provide call detail billing? \_\_\_\_ Yes \_\_\_\_ No

B.4 Is call detail billing an important service? \_\_\_\_ Yes \_\_\_\_ No Why?

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B.5 Do you consider call detail billing an important service *in the future*? \_\_\_\_ Yes \_\_\_\_ No  
Why?

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B.6 Do you permit a customer to connect a PABX to a leased circuit? \_\_\_\_ Yes \_\_\_\_ No. If no, why?

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B.7 Are digitized voice systems permitted? \_\_\_\_ Yes \_\_\_\_ No. If no, Why?

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B.8 Is telephone equipment available only from \_\_\_\_\_ or can telephone equipment be obtained from private companies?

\_\_\_\_\_ Administration Only  
 \_\_\_\_\_ Private Companies  
 \_\_\_\_\_ Either/Both

## C. Telex

C.1 Do you provide call detail billing for telex service?  
 \_\_\_\_ Yes \_\_\_\_ No If no, Why not?

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C.2 Do you consider call detail billing an important service for the future? \_\_\_\_ Yes \_\_\_\_ No. If no, Why not?

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C.3 Do you permit the encryption of telex data? \_\_\_\_ Yes \_\_\_\_ No. If not, Why not?

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C.4 Do you permit the refiling of telex messages? \_\_\_\_ Yes \_\_\_\_ No. If no, Why not?

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C.5 Is telex equipment available only from \_\_\_\_\_ or can equipment be obtained from private companies?

\_\_\_\_\_ Administration Only  
 \_\_\_\_\_ Private Companies  
 \_\_\_\_\_ Either/Both

## D. Leased Circuit Services

D.1 Do you permit the transmission of data over the public switched telephone network to access international leased circuits? \_\_\_\_ Yes \_\_\_\_ No. If no, Why?

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D.2 Do you permit a company to share the use of their domestic/international private leased circuit? \_\_\_\_ Yes \_\_\_\_ No. If no, Why?

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D.3 Do you encourage a company to use a public network rather than an international leased circuit? \_\_\_\_ Yes \_\_\_\_ No. If yes, Why?

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D.4 Are customers in \_\_\_\_\_ permitted to provide their own network management equipment and services? \_\_\_\_ Yes \_\_\_\_ No. If no, Why?

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D.5 Do you consider 'volume sensitive pricing' to be an important method of pricing for domestic/international leased line services? \_\_\_\_ Yes \_\_\_\_ No Why?

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D.6 Do you have plans to implement 'volume sensitive pricing' for domestic/international leased circuits? \_\_\_\_ Yes \_\_\_\_ No. If Yes, when?

\_\_\_\_ 1-2 Yr \_\_\_\_ 2-3yr \_\_\_\_ 3-5yr \_\_\_\_ Over 5 years

## E. Service Development

E.1 Do you consider ISDN to be an important service standard? Why?

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E.2 In what time frame will 'Base Rate' ISDN services be available?

\_\_\_\_ Now \_\_\_\_ 1-2yr \_\_\_\_ 2-3yr \_\_\_\_ 3-5yr \_\_\_\_ Over 5 years

E.3 In what time frame will 'Primary Rate' ISDN services be available.

\_\_\_\_ Now \_\_\_\_ 1-2yr \_\_\_\_ 2-3yr \_\_\_\_ 3-5yr \_\_\_\_ Over 5 years

E.4 ISDN provides an opportunity to offer many new services. Of the many services that *could* be provided; which do you consider to be the most important in your planning? Why?

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E.5 Do you consider X.400 to be an important development for international services?  
 \_\_\_\_ Yes \_\_\_\_ No. Why?

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E.7 In many countries, there is significant development in providing virtual (software defined) networks. Is this an important development in \_\_\_\_\_? Why or why not?

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E.8 Are value added network services important to the development of telecommunications services in \_\_\_\_\_? \_\_\_\_ Yes \_\_\_\_ No. Why or why not?

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E.9 Can you briefly describe the value added network services you provide today (ie. Electronic Mail, EDI, Remote Computing Services, Database Services, etc.)

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E.11 Do you have service arrangements with vendors such as GEIS?  
 \_\_\_\_ Yes \_\_\_\_ No. (If yes, can you tell me who).

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E.12 Can you describe what types of new 'value added' service applications you plan on providing over the next five years?

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E.13 Do you consider cellular telephone services to be important to the development of telecommunications services in \_\_\_\_\_?

Why or why not?

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E.14 Considering international services, please estimate the percentage growth *per year* over the next five years for the following types of service.

	% Growth
Telephone	_____
Telex	_____
Leased Circuits:	
Terrestrial	_____
Satellite	_____
Public Data Network	_____
Value Added Network Services	_____
Cellular Telephone	_____
Facsimile	_____

## F. Customer Support

F.1 During regular business hours, how long does it take to respond to a problem such as a line outage?

\_\_\_ 1 Hour or Less \_\_\_ 1-2 Hours \_\_\_ 2-3 Hours \_\_\_ 3-4 Hours  
\_\_\_ Over 4 Hours

F.3 On average, how long does it take to fix a problem once a request has been received?

\_\_\_ 1-2 Hours \_\_\_ 2-3 Hours \_\_\_ 3-4 Hours \_\_\_ 4-6 Hours  
\_\_\_ 6-12 Hours \_\_\_ 12-24 Hours \_\_\_ 24-48 Hours \_\_\_ Over 48 Hours

F.4 For foreign organizations operating telecommunications services in \_\_\_\_\_, are you able to provide full network management services including trouble reporting and management reports?

\_\_\_ Yes \_\_\_ No



F.5 Do you consider network management a service that you should be able to provide in the future? \_\_\_ Yes \_\_\_ No Why?

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F.6 As you consider new services; which of the following forms of development do you generally prefer. Why?

- \_\_\_ Develop yourself
- \_\_\_ Buy Hardware or software from another firm
- \_\_\_ Establish relationship to assist in development

F.7 When considering organizations to assist in a development project, could you describe the most important factors in your decision process?

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F.8 There are many new cable systems being implemented in the Asia/Pacific area. Do you think that these will have an affect on service tariffs. \_\_\_ Yes \_\_\_ No. If yes, what will the affect be?

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## G. Rates and Tariffs

G.1 Rates and tariffs have been declining over the past few years. Do you expect this trend to continue over the next five years? \_\_\_ Yes \_\_\_ No. Why?

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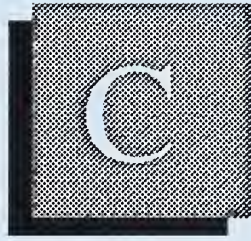
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G.2 For each of the following services, could you provide a projection of the percentage increase or decrease *per year* in tariffs over the next five years.

	% Inc	% Dec	No Change
Operator Assist. Calls	_____	_____	_____
Direct Dial Calls	_____	_____	_____
Telex	_____	_____	_____
Telex Grade Circuits	_____	_____	_____
AVD Circuits	_____	_____	_____
Wideband Circuits(Analog)	_____	_____	_____
Digital Circuits	_____	_____	_____
Packet Network Services:			
Domestic Network	_____	_____	_____
International Network	_____	_____	_____

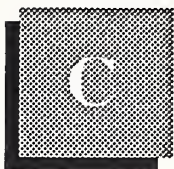


## Appendix: Terms and Definitions









## Appendix: Terms and Definitions

*Voice Services* - Services based on the use of a public switched telephone network for the transmission and receipt of data.

*Text Services* - Services related to the transmission of image and text such as facsimile and electronic mail.

*Public Data/Value-Added Network* - A commercial network, generally employing packet technology, used for the transmission of text and data.

*Value-Added Network* - Network transmission facilities, augmented with computerized switching features and providing services such as store-and-forward message switching, electronic mail, electronic data interchange, and having terminal interface and error detection and correction.

*ISDN* - Integrated Services Digital Network

*Transport Services* - Use of a public network for the connection of a remote terminal or computer to a host computer. Generally refers to the use of a public network as an alternative to a leased circuit.

*Low Speed Circuits* - Leased circuits ranging in speed from "quarter speed" to 1200 bps.

*Medium Speed Circuits* - Leased circuits generally ranging in speed from 2400 bps to 9600 bps. Also frequently referred to as AVD circuits.

*AVD* - Alternate Voice Data

*Wideband Circuits* - Leased circuits generally ranging in speeds starting at 48 to 50 Kbps. Wideband circuits may be analog or digital.

*Telex Grade Circuits* - Same as low speed circuits.

*PSTN* - Public Switched Telephone Network

*EDI* - Electronic Data Interchange

*IRC* - International Record Carrier

*PRC* - People's Republic of China









